INDEX NUMBER

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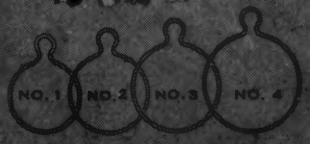

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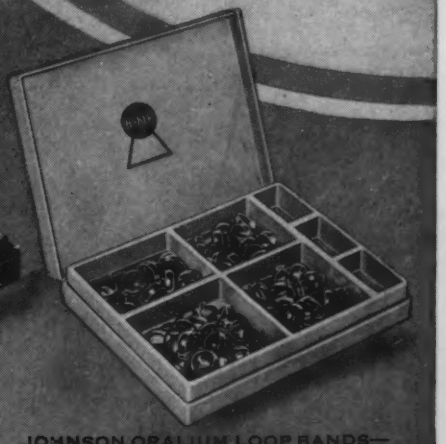

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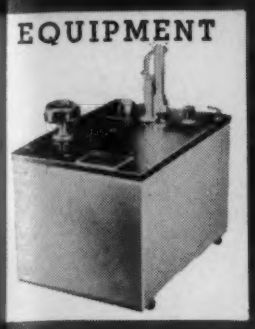

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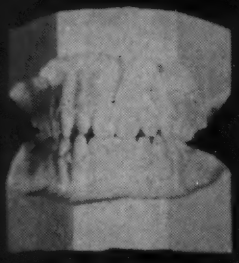

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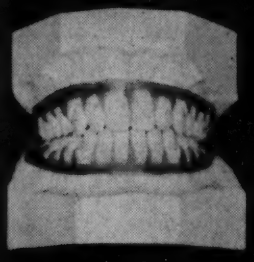

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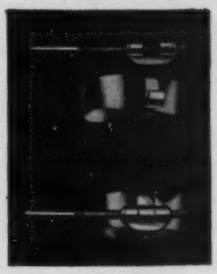

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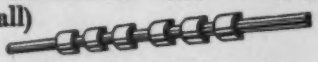

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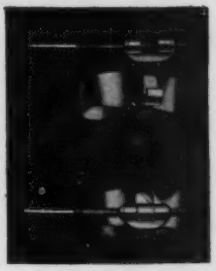

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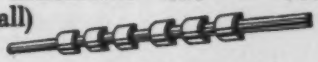

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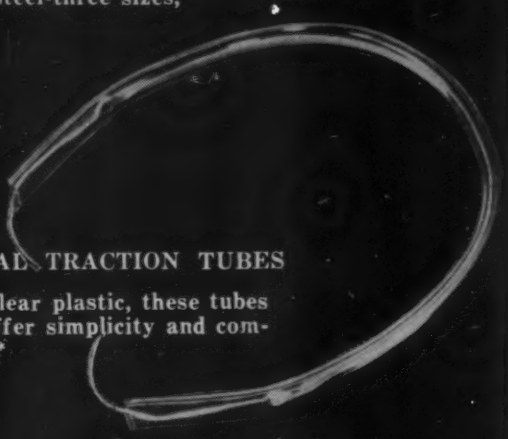

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VOL. 42 DECEMBER, 1956 No. 12

Original Articles

THE FACTOR OF STABILIZATION IN ANCHORAGE

EARL W. RENFROE, D.D.S., M.S., CHICAGO, ILL.

INTRODUCTION

THE ever-present equation of anchorage during treatment still remains to be solved in a manner satisfactory to all orthodontics. Its solution is not easy because of individual differences in background, philosophy, and ability. In addition, appliances, in themselves, have varying capabilities and the same appliance in the hands of different operators can produce varied results.

A review of the literature on this subject reveals a decreasing amount of material and a lack of new ideas, as well as a disturbing and growing inference that some anchorage is, to a greater or lesser degree, unusable or inadequate. Modern writings contain such phrases as "true anchorage is not available within the mouth," "stationary anchorage in orthodontia therefore is a myth," "stable anchorage is not available in the mouth," "anchorage cannot be prepared," and one text has a chapter entitled "The Inadequacy of a Reciprocal Intermaxillary Force."

The earlier writers, among them Angle, Case, Dewey, McCoy, and others, seem to have had a much better understanding of anchorage problems that we. In spite of the fact that we have much more efficient mechanisms today, the basic formulas for anchorage which they gave us are either ignored or have been forgotten.

Read before the Central Section of the American Association of Orthodontists, Chicago, Illinois, Oct. 1, 1956.

More than a half-century ago, the awareness of the behavior of teeth under stress prompted Angle to classify those reactions as simple, stationary and reciprocal anchorage. In spite of a few elaborations by others, this classification still remains basic when applied to treatment. Interpreting his classification, simple anchorage is that form in which the teeth are permitted to tip; stationary anchorage is that form in which the teeth are not permitted to tip and, if they move, must do so in an upright and bodily manner, thus being much more resistant; and reciprocal anchorage is not a distinct form of anchorage, but a reciprocal force working equally at both ends, which has many applications.

Then, as now, two sources of anchorage were recognized—extraoral and intraoral. Intraoral anchorage makes use of the teeth, the biologic reaction of bone, and the influence of musculature, while extraoral anchorage depends upon the cranium and the neck for its source.

Fortunately, the correction of most malocclusions is successfully accomplished by simple, reciprocal, and stationary anchorages which are only *relatively* stationary. As Angle put it, "Some displacement of anchor teeth is admissable and sometimes desirable, provided those teeth stay within the limits of final restoration by means of the inclined planes of occluding teeth." There are some cases, however, in which anchorage that is absolutely stationary is desired.

The difficulty of establishing intraorol stationary anchorage of an immobile or fixed nature was fully recognized, but such anchorage was not considered unattainable.

It is the purpose of this article to restate these principles of anchorage and to present some methods of applying them to gain the desired degree of stability. In addition, I hope to refute, to some degree at least, the contention that only extraoral anchorage is stable.

THE SOURCES

The fundamental premise upon which all appliance therapy is based is Newton's Third Law of Motion: "For every force there is an equal and opposite reaction." An understanding of this equal and opposite reaction to a force is necessary to produce the desired type of anchorage.

Angle, Case, Strang, Salzmann, Oliver, and others, in their writings, have referred to anchorage as being composed of units or components of resistance. These may be a single tooth, a group of teeth, or any other anatomic area of the head which, by use of an appliance, can be made to offer resistance to movement.

I. Intraoral Sources

Within the oral cavity, units of resistance are found in the teeth, the alveolar bone, the basal bone of the jaws, and in the musculature surrounding them. These are commonly referred to as intraoral sources.

A. *Alveolar Bone.*—While a discussion of the support of a tooth in its alveolus and the histologic process of tooth movement will not be included

here, it must not be forgotten that the alveolar bone has a mechanism for resisting the movement of teeth. When force is applied to a tooth to move it, it stimulates a rearrangement of the alveolar trabeculae in a direction to offer greater resistance to the new force. An ideal anchorage situation would be one in which the reactive force was distributed over enough of the root surface to cause only this rearrangement of bone. When the force exceeds this amount, the bone yields, permitting the tooth to move. Alveolar bone yields strategically in that, while permitting a tooth to move, it still resists.

B. *The Teeth.*—

1. *Roots:* The teeth themselves have mechanisms whereby they resist movement, although they vary greatly in their individual ability to do this. These differences are due to variations in the form, size, number, length, position, and inclination of the roots.

Form. The form of the root is an indication of the direction of the stresses to which the tooth is subjected. The premolar teeh, with their round roots, are but connecting elements which transfer forces from the molars to the canines. They give continuity to the human dental arch and the small round roots resist force equally from any direction.

Incisors, canines, and molars have characteristic root forms which indicate their ability to resist certain directional stresses. The flat roots of the mandibular molars and incisors indicate that they can resist forces best in the mesiodistal direction and least in the buccolingual direction, while the triangular form of the roots of canines and maxillary incisors indicates that they are adapted to resist forces from the lingual direction. These roots present two surfaces which taper toward the lingual side, thus permitting a tensing of two-thirds of the periodontal membrane fibers to resist a labial displacing force.

The multirooted maxillary molar has a tripod arrangement of roots, each with a different form. The large lingual root is rounded to resist extrusion, while the flattened and more diminutive mesiobuccal roots resist intrusion as this tooth is pushed buccally in function. In ability to withstand mesiodistal stresses, it is not comparable to the mandibular molar.

Size and number. The size and number of the roots of each tooth are another indication of the tooth's ability to withstand stress since the greater the surface area, the more periodontal membrane fibers it can support to increase its stability. Thus, the large flat roots of the molar offer more resistance than the small flat root of the incisor, although both are designed to resist movement from the same direction.

Length. The length of a root indicates the depth to which it is embedded in bone, and the deeper it is embedded, the stronger is its resistance to dislodgment. The canines generally and the maxillary canine in particular are examples of deeply embedded teeth.

2. *Position in dental arch:* Position in the dental arches may also be significant. For example, the mandibular second molar, although without a root length comparable to the canine, is located between two high ridges of basal bone, mesial to the retromolar fossae of the mandible. Because of this,

it offers more resistance to bodily mesial movement than any other tooth in the mouth. Fig. 1 is presented as an example of this stability. It shows a Class III case with missing first permanent molars. With only the two mandibular second molars used as anchorage, the remaining mandibular teeth were moved en masse to a normal relation with the maxillary teeth. No intermaxillary traction was used at any time.

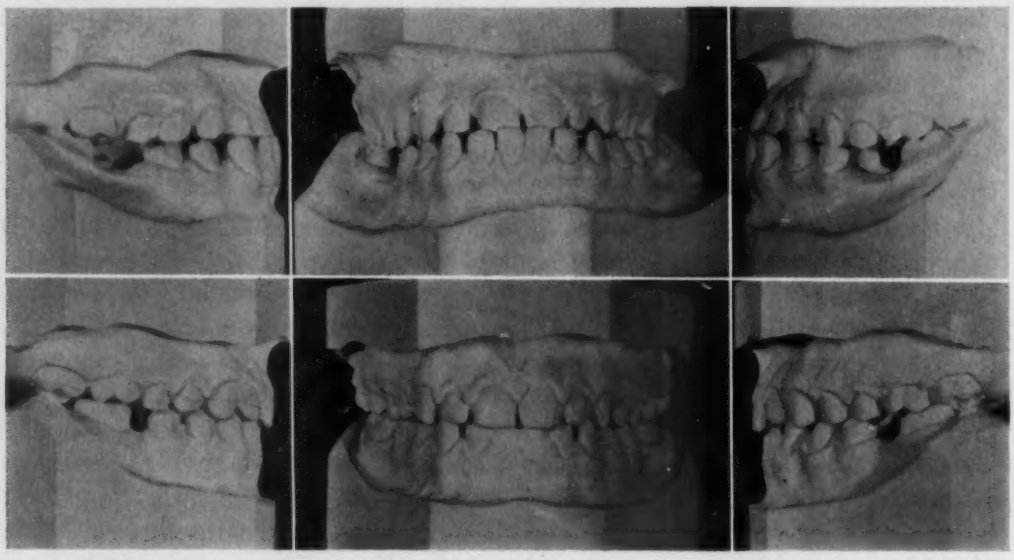

Fig. 1.—Case AGN from the files of the Departement of Orthodontics, University of Illinois, showing anchorage value of mandibular second molars, which were used to move all remaining mandibular teeth distally into normal relation with maxillary teeth. No intermaxillary or extraoral source was used.

3. *Inclination:* The inclination of a tooth is important in assessing its value as a source of anchorage. When the axial inclination is in a direction opposite the force acting upon it, it offers greater resistance to dislodgment. This is due to a portion of the force being expended down the axis of the tooth to the bone beneath, thus tensing more of its periodontal membrane fibers and causing the roots to dig in.

Applying the factors which enable a tooth to resist movement, an appreciation of the relative values of individual teeth as anchors can be gained. From my viewpoint, a listing in order of diminishing resistance would be as follows:

Mandibular molars
Maxillary canines
Mandibular canines
Maxillary molars
Maxillary central incisors
Mandibular premolars
Maxillary premolars
Maxillary lateral incisors
Mandibular lateral and central incisors

4. *Mutual support:* In addition to the resistance offered by an individual tooth, each tooth in the arch is supported by contact with another on either side of it, with the exception of the last molar on each side. Also, the entire mandibular arch is confined by the maxillary arch with one cusp buccally and labially. The maxillary molars support the mandibular arch posteriorly from lingual pressures by holding the buccal cusps of the mandibular molars between their buccal and lingual cusps. A mechanism of adjustment to wear, the anterior component of force, normally keeps these teeth in tight contact. Thus, no tooth can be considered as anchorage unless its relationship to other teeth in the dental arches is also considered.

Teeth mutually supporting each other can contribute best to the over-all resistance value when they are in line, because the force of the reaction can pass in a relatively straight line through the contact points and receive maximum support from each tooth. Malaligned teeth cause the force to be expended principally against the first tooth while those behind are driven further out of alignment to dissipate the force.

It should be realized that the teeth in a malocclusion also mutually support each other, and that some malrelationships can be utilized as anchorage.

Before ending the discussion of the ability of teeth to resist movement, mention should be made of the common but abnormal condition of ankylosis and its significance to anchorage. The ankylosed tooth, being fused directly to the alveolar bone, is without a periodontal membrane attachment and cannot be moved orthodontically. Thus, in some instances its presence may be exploited as a source of anchorage before its removal.

C. *Basal Bone.*—It has been established that orthodontic therapy cannot change the underlying basal bone, but some areas of hard basal bone are available intraorally as bearing areas to augment intramaxillary or intermaxillary anchorage to provide stability of the immobile type. These areas include the hard palate of the maxilla and the lingual surface of the mandible in the region of the roots of the teeth.

D. *The Musculature.*—The re-establishment of muscle tonicity as associated therapy in treatment is common practice. Alfred P. Rogers has treated malocclusions with no force other than that of musculature. However, the use of muscles as an active adjunct to anchorage mechanisms is an almost unexplored source of resistance. The normal tonus of the facial and masticatory muscles exerts pressures on the denture to equalize pressures from within and has an important part in molding and holding the form of the arches. Abnormal musculature tones, such as hypotonic and hypertonic, likewise have their effects on the denture. The hypotonic types permit the flaring and spacing of teeth, while hypertonic muscles do the opposite, crushing the teeth lingually. The stability of the anchorage of a dental arch may be materially increased by the temporary utilization of a hypertonic labial musculature.

II. Extraoral Sources

Extraoral anchorage is that form which dissipates the equal and opposite reaction to a force upon areas outside the mouth. Usually these areas are either the cranium or the neck. Use of the former is known as occipital anchorage and use of the latter, as cervical anchorage. Modern headgears which utilize the cranium, as opposed to the earlier headcaps of Fox, Kneisel, and Angle, cannot be considered entirely occipital anchorage, for they support a cervical strap which, in itself, actually provides some of the anchorage. It has not been demonstrated that either the cranium or the neck is damageable by the pressures of these appliances; thus, they are considered absolutely stable.

USE OF THE SOURCES

With the knowledge of the available sources of anchorage in mind, we are now confronted by the mechanical problem of assembling them in amounts necessary for a given problem. The plan of treatment determines whether the type of anchorage employed should be simple, reciprocal, or stationary. As we stated previously, the problem of establishing simple or reciprocal anchorage is relatively uncomplicated. The difficulties seem to lie chiefly in producing the *desired degree* of stationary anchorage. When immobility of stationary anchorage is needed, the problem of building it becomes more complex, especially when we rely upon the teeth as the units of resistance. The utilization of the maximum resistance of the dental units by means of the appliance should be the first consideration. Should this prove inadequate, it should be supplemented by utilizing other sources, either intraoral or extraoral, or both.

I. Intraoral Sources

A. *An Individual Tooth.*—When an individual tooth is to be used as the unit of resistance, a simple rule regarding the method of attachment to it should be applied. The attachment must be rigid so that the tooth will not tip under stress. A mandibular molar, prevented from tipping mesially by its attachment, will be stable enough to move the teeth mesial to it. When a maxillary canine is adequately prepared as the unit of resistance, it will provide enough anchorage to move any tooth distal to it.

B. *Multiple Tooth Units.*—As Case has stated, "Two teeth scientifically united will more than double the resistance of one tooth." When a number of teeth are used as the source of anchorage, the prevention of movement between the included teeth is the primary consideration. There are three possible ways to do this: (1) encasement, (2) solid union between bands, (3) appliance manipulation.

1. *Encasement:* Groups of teeth used to support a fixed bite plane are generally encased in acrylic or metal by means of cement. A mold of the teeth to be used is covered with acrylic or metal and the bite plane is attached. After trial and adjustments, it is cemented to the teeth and thus movement

between the included teeth is prevented. Such procedures are generally limited to small groups of teeth, such as the lower six anterior teeth. Its use as a method to immobilize all the teeth in one arch is impractical.

2. *Solid union between bands:* The second method of preventing movement in multiple tooth units is to fit the teeth with bands which are united to each other and cemented into place. Bands are fitted to the teeth and an impression is taken, after which they are removed and placed into the impression. The interproximal areas between them are filled with wax and the impression, with the bands in place, is poured. When dry, the wax is removed and solder is flowed between the bands, uniting them at their contacts and filling the interproximal spaces. The series of connected bands is then cemented to the teeth. So long as the cement holds and the bands are not stretched away from the tooth surface, teeth so united cannot change their relationships.

This method also has its limitations. The amount of separation necessary to permit placement on a full complement of teeth would be excessive. However, it might be applied in instances where slight diastemata are present. It finds its best usage in small groups of banded teeth. The anchorage value of two lower molars so united would be inestimable.

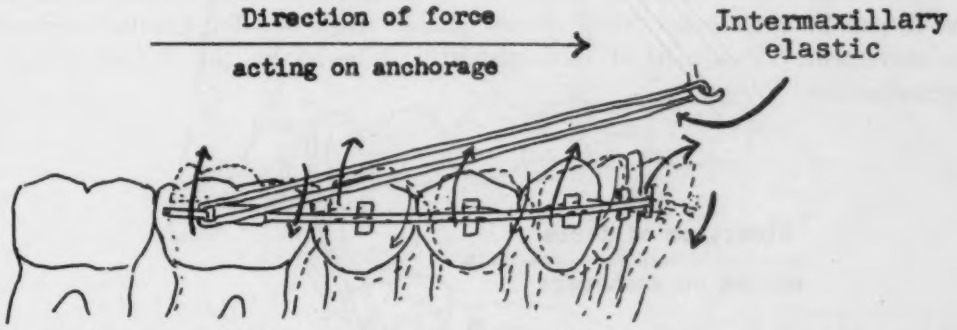

Fig. 2.—Changes in vertical relationships between teeth. Solid line represents original position; broken line represents movement of anchorage.

3. *Appliance manipulation:* The third method of preventing movement between anchor teeth is by appliance manipulation. With most techniques, there are no rigid fixations between the anchor teeth themselves or between the arch wire and the teeth. Only the bands are rigidly attached to the teeth by cement.

The diameter of the arch wire is usually smaller than the size of the bracket slot to facilitate ease of placement which allows some degree of play. Arch wires have resiliency which varies according to the size and the material and under stress can and do flex between the points of attachment. Either play, resiliency, or a combination of both will permit vertical changes between contact points. Finally, ligature ties loosen with time. These factors permit movement between the anchor teeth, which stimulates bone changes with the consequent tipping and rotating of teeth associated with anchorage slippage (Figs. 2 and 3).

Further, it cannot be assumed that, by simply constructing the appliance according to its prescribed manner, maximum anchorage has been achieved. As an example, some users of the edgewise appliance have departed from the traditional 0.022 by 0.028 arch wire, substituting 0.021 by 0.025 rectangular wire and round wires of even smaller diameters. The use of smaller-gauge wires of gold or stainless steel has many advantages when moving teeth, but disregards the principles of anchorage stability when used on teeth designated as anchors.

The inability to establish rigid fixations between all parts of the appliance calls for compensating adjustments of its parts which will prevent, as far as possible, movement of the anchor teeth. These adjustments would be as follows:

1. The diameter of the arch wire should be as large as the bracket will accommodate.
2. The arch wire should be as stiff as possible to reduce arch flexibility.
3. Mild tipping bends should be incorporated in the buccal sections in a direction which will keep the teeth upright while under stress.
4. Mechanisms to prevent rotations of the teeth should be used.

To utilize the resistance factor of inclination, all the anchor teeth may be tipped in a direction which would enable them to offer greater resistance to movement. This method is consistently followed by the Tweed group of orthodontists.

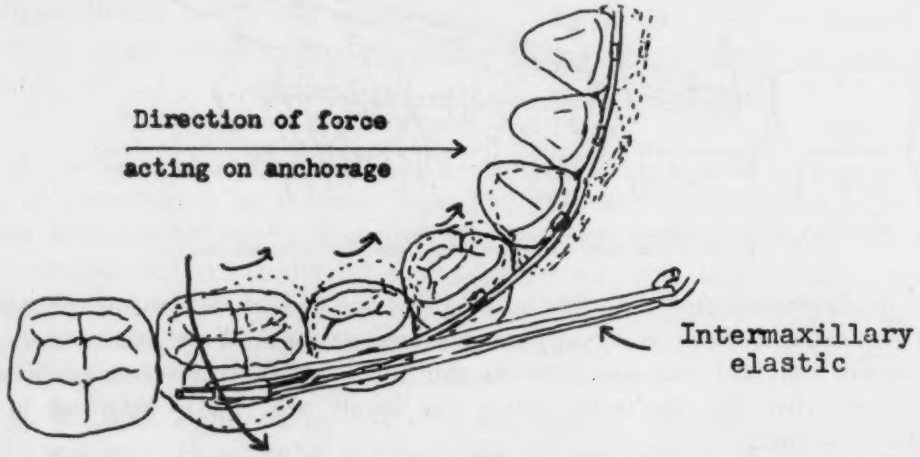

Fig. 3.—Changes in horizontal relationships between teeth. Solid line represents original position; broken line represents movement of anchorage.

C. *Occluding Teeth.*—When everything possible has been done with the teeth in one arch to achieve maximum stability and more is required, additional sources of anchorage must be added. One such source may be found in the maloccluded teeth of the opposite arch. The excessive overbite of anterior teeth is an example.

A Class II, Division 2 (Angle) case presents with lingually blocked mandibular second premolars and a deep overbite. It is desired that the molars

be moved distally to make room for the proper placement of the premolars. Within that arch, the only anchorage available is the teeth mesial to the second premolars. These teeth alone are inadequate as anchorage units for the proposed movement. However, the retruded maxillary anterior teeth are in close contact with the anterior teeth of the mandibular arch. Forward movement of the mandibular anchorage owing to reaction would be resisted by the maxillary overbite, and a combination of the two resisting groups may be adequate for the proposed distal movement of the molar teeth.

D. *The Basal Bone.*—Stability of anchorage can be further augmented by the use of the basal bone of the jaws. These areas are employed as bearing areas against which the reaction to a force is dissipated. A device bearing upon them and connected to the molar teeth prevents them from moving mesially, thus adding immobility to the anchorage potential of the teeth.

The devices which make use of basal bone are known as (1) holding arches and (2) removable anchorage. The maxillary holding arch is known as the Nance holding arch, since it is the invention of Hayes Nance of California.

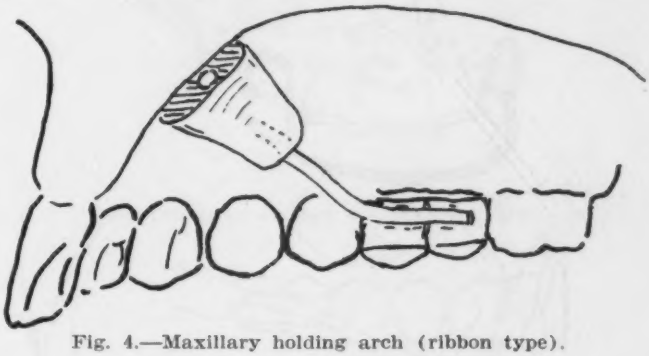

Fig. 4.—Maxillary holding arch (ribbon type).

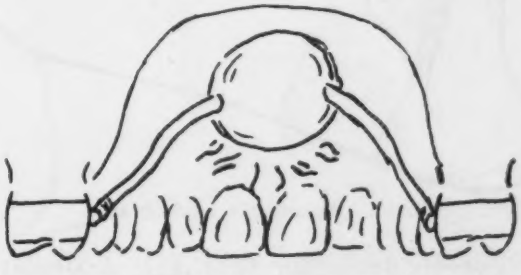

Fig. 5.—Maxillary holding arch (button type).

1. *Maxillary holding arch (Figs. 4 and 5):* The maxillary holding arch is a lingual arch of 0.040 round wire adapted to the tissues of the palate above the apices of the maxillary incisors. Thus, it lies in the upper and most anterior part of the vault of the mouth. There it is encased in a button of acrylic the size of a five cent piece or in a ribbon approximately ¼ inch wide. The posterior ends of the wire are adapted and soldered to the lingual surfaces of the molar bands. When cemented in place, mesial movement of the molars is prevented.

This device, coupled with the second premolar and possibly the second molar, provides sufficient intramaxillary anchorage for the bodily retraction of canines and remaining anterior teeth.

It can also be used in extraction cases to permit the canines to move distally under musculature pressure. In such cases the appliance is placed before the premolars are removed. No further adjustments are made for a period of two to three months. During that period the canines, under the influence of musculature pressure, will have drifted distally and may be in contact with the second premolars. If not, the distance remaining will have been lessened considerably.

One bit of caution is necessary. When used as anchorage to retract canine teeth, the adjustments should never be so severe that the reaction would push the acrylic into the tissues.

Fig. 6—Maxillary removable anchorage.

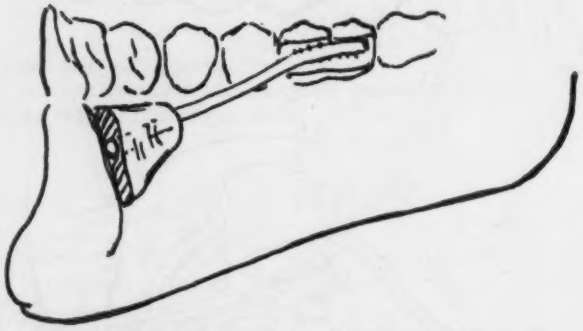

Fig. 7.—Mandibular holding arch.

2. *Maxillary removable anchorage (Fig. 6):* A similar device, which uses the same principle, is the removable anchorage described by Bedell. In this appliance, a full palate of acrylic is used which has incorporated into it wires to support two half-round molar posts. The posts are received into half-round tubes on the lingual surfaces of the molar bands. In addition, there is a labial wire, making it similar in appearance to a Hawley retainer, but with clasps on the canines. Unlike the Nance holding arch, it is removable, but likewise utilizes the anterior hard palate as a bearing area.

3. *Mandibular holding arch (Fig. 7):* The mandibular holding arch is similar in every respect to the maxillary devices, except that the bearing area

in the mandible is much smaller than in the maxilla. The area available for the fixed type is the lingual surface of the mandible in the areas of the apices of the incisors and below as far as the mucolingual fold will permit. A ribbon type of acrylic abutment is indicated, since a button would interfere with the attachment of the tongue.

4. *Mandibular removable anchorage (Fig. 8):* This appliance is similar to a lower Hawley, using the lingual surface of the mandible. Like the upper, it supports two vertical half-round posts which engage half-round tubes on the molars and it has a labial wire and canine clasps.

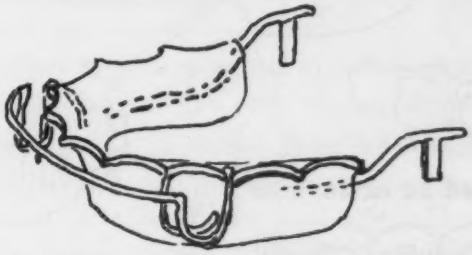

Fig. 8.—Mandibular removable anchorage.

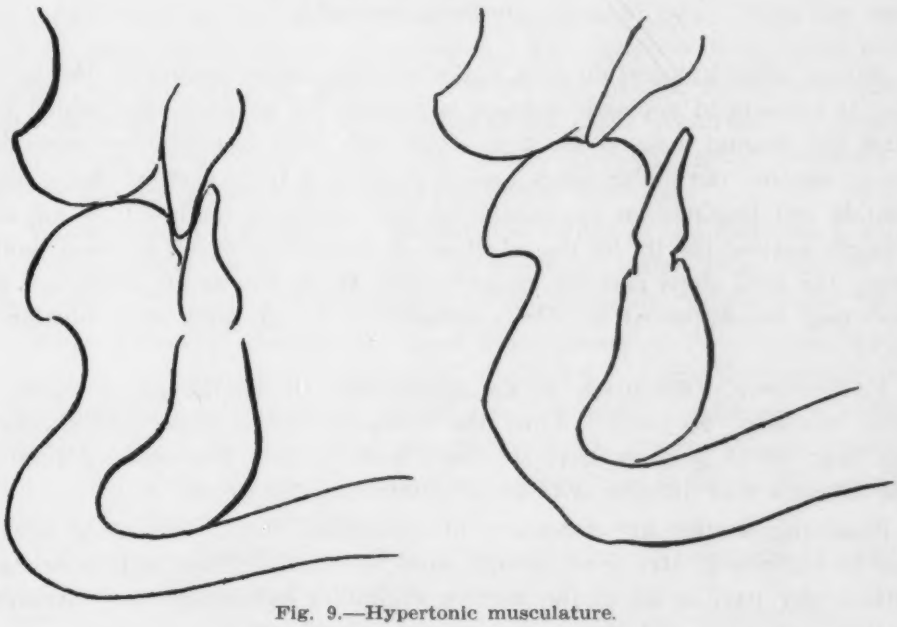

Fig. 9.—Hypertonic musculature.

While these devices are primarily intramaxillary anchorage units, they are applicable as units of anchorage for intermaxillary problems that require stability of anchorage for the use of intermaxillary elastics.

E. *Musculature.*—An awareness of the possibilities of using musculature as anchorage was brought about by the use of devices designed for other purposes, but which inadvertently produced tooth movement (Fig. 9).

One such device is the lip guard or bumper (Fig. 10), designed to remove the pressure of the hypertonic lip from lingually displaced lower anterior teeth. Being supported posteriorly against the molar teeth, the reaction is to move the molar anchor teeth distally. In one instance the distal movement was sufficient to change the classification from Class I to Class II.

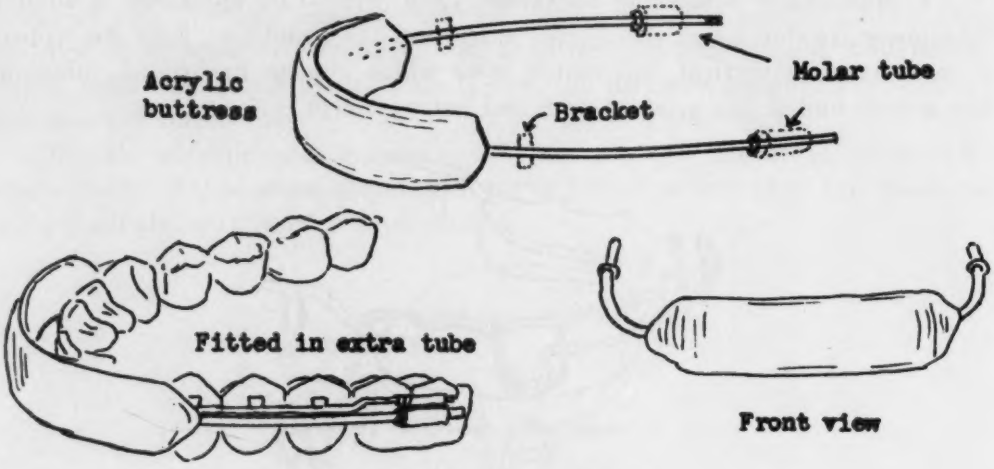

Fig. 10.—Lip-bearing appliance.

It is a labial application of a tissue-bearing device similar to the holding arch. It consists of a plastic surface supported by an arch wire which bears against the lingual area of the lips. The arch wire is supported posteriorly by stops against the molar tubes and is prevented from vertical displacement by bands and brackets on the canine or first premolar teeth. It is advanced anteriorly against the lip by the addition of washers or turns of brass ligature between the arch stops and the molar tubes. In its use as an anchorage unit, it also may be supported by direct attachment to the arch wire uniting the teeth.

F. *Retention.*—Retention is an application of anchorage to resist the relapse tendency of teeth. After the treatment of a malocclusion, certain forces exist which tend to drive the teeth back to their malocclusion positions. These forces are as definite as those originating in the appliance.

Retaining devices are necessary to antagonize them. In every instance, a base of sufficiently strong anchorage must be obtained, even if it is necessary to utilize any part or all of the sources available, intraorally and extraorally.

An appreciation of the resistance values of different teeth is of great value in devising retention, for "It should not be expected that a lateral will hold a cuspid in line after the latter has been moved, or a bicuspid to maintain a molar."

II. Extraoral Sources

The use of either the cranium or the neck as a source of anchorage requires the making of a harness to bear upon them and a connecting mechanism to

transfer its force to an interarch appliance or directly to the teeth themselves. The connections to the denture are made with metal hooks or conventional face-bow and "E" type arch.

A. *Occipital.*—The cranium is utilized as a bearing area by means of a skullcap or a harness made of belting material which encircles the head. The original skullcaps brought pressure to bear against the occipital bone; thus, the name "ocipital anchorage."

B. *Cervical.*—The neck is utilized as a bearing point by means of a strap of elastic ribbon or belting material, the ends of which are attached to the connecting mechanism. The belting type is folded into a "V" at the back of the neck to make it form-fitting.

Traction from either type is obtained by metal hooks on the arch wire or by a face-bow and arch either to the arch wire or directly to the molar teeth.

Hooks: The metal hooks, fashioned from 0.045 steel wire, are formed to attach onto the arch wire mesial to the canine teeth. They are kept from sliding by studs or hooks attached to the arch wire. The other end of the hook is formed to hold the elastic ribbon material or a rubber band.

Face-bow and arch: The "E" arch, 0.045 stainless steel wire, is fitted into 0.045 tubes on the molar teeth. It is adjusted away from the anterior teeth by stops mesial to the molar tubes. The face-bow wire, 0.059 or 0.060 stainless steel, is adapted around the curvature of the cheeks and the ends bent into hooks just in front of the lobes of the ears. Anteriorly, it is attached at its center to the center of the "E" arch. It must emerge passively from between the lips and not bear upon the tissues of either.

When unilateral pressure is desired, the center of the face-bow is attached to an intermediate wire, 0.059 inch in diameter, which runs parallel to one side of the "E" arch and is attached to it just mesial to the molar tubes.

When extraoral devices are used as auxiliary units of anchorage they are used in combination with intraoral appliances. Thus, they permit the use of intermaxillary anchorage or elastic traction which might not otherwise be available. They are also used alternately with intermaxillary traction to permit relief of the source of intraoral anchorage, that is, intermaxillary elastics by day and intraoral anchorage by night.

The devices described are but a few of many types used for attaching dental units to the cranium or neck.

SUMMARY AND CONCLUSIONS

The achievement of stable anchorage in orthodontics is associated with the ability to apply its principles, which are as follows:

1. Anchor teeth must remain upright.
2. Movement between teeth must be avoided.
3. Anchorage en masse must not move.

It is the resiliency of the wire, the existence of play in the bracket, and the union of parts with ligature ties which permit the movement between anchor teeth.

Anchorage, to be stable, must be overwhelmingly more resistant than the teeth being moved. To achieve this, the following points must be considered:

1. The reactive forces should be distributed over a number of units to reduce their effect on any one to a minimum.
2. As many teeth as are available as anchorage, including the second molars when possible, should be banded.
3. Adjustments should be made in the arch wire to offset the tipping and rotating tendencies of teeth which are used as units of resistance.
4. Holding arches should be used when adequate stability cannot be obtained with the appliance.
5. Intraoral anchorage should be supplemented with extraoral anchorage when holding arches are not used.

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127 NORTH DEARBORN ST.

THE NORM CONCEPT AND CEPHALOMETRICS

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THE concept of the statistical norm has been introduced into orthodontics during the last three decades, beginning with the writings of Simon and Hellman. Recent years have brought both support and challenge of the applicability of the norm concept to orthodontics. The combination of the norm concept and the oriented radiogram at times has been visualized as providing an objective, "scientific" basis for diagnosis and treatment planning. Others, impressed with the wide variation in facial structures, have not considered it helpful to visualize the patient in relation to a normative frame.

Since cephalometric studies of the normative type are continually being described in the literature, it seemed pertinent to attempt an evaluation of the norm concept as applied to cephalometric data, and then to consider some controversial points. To this end, this article considers (1) some uses and limitations of norms and (2) a few evaluations of normative data for diagnosis and treatment planning.

SOME USES AND LIMITATIONS OF NORMS

Since the greatest abuse of norms stems from utilizing them beyond their scope, it seems worth while to describe some of their restrictions. For this, it is most important to distinguish between describing growth and evaluating growth.[1] It is one thing to say that a person is tall for his age; it is quite another to say that he is too tall. The first statement describes growth, while the second makes an evaluation that an abnormality exists and that treatment is indicated. Likewise, description is involved when we state that a patient has an incisor-mandibular plane angle of 100 degrees, which is two standard deviations above the mean. This is descriptive of a condition that exists, and is to be distinguished from statements of appraisal that this is a patient with dental protrusion or that it is a premolar extraction case. Although evaluations of this kind are sometimes implied, the distinction between evaluation and description is essential. It is abusing a norm to make an evaluative judgment from a norm that is useful for description only. Appraisals are a professional responsibility of the orthodontist; norms can often assist in discharging this responsibility.

A more specific outline of the role of norms can best be presented by first describing the construction of a theoretical norm. Assume that we wish to

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construct a norm for the angulation of the lower central incisors and the base of the mandible for 13-year-old Chicago girls. First, oriented radiograms would have to be obtained for girls who had reached their thirteenth birthday, and this angle would have to be measured. Once these data were available, the next step would be to organize the records. In effect, this would be equivalent to arranging the records in series from the smallest to the largest. Finally, the records must be divided into workable divisions. A useful and convenient division is obtained by creating five categories, as has been done with the height and weight norms sponsored by the American Medical Association and the National Education Association.[2] We would then have a reference frame, a yardstick, or a norm, describing the 10 per cent of the group with the smallest values, or those below the tenth percentile, as having a "small" incisor-mandibular plane angle. The next 20 per cent of the cases, or those between the tenth and thirtieth percentiles, would be described as having a "moderately small" angle, while the middle 40 per cent, or those between the thirtieth and seventieth percentiles, would be described as having an "average" angle. Those between the seventieth and ninetieth percentiles, or the 10 per cent with the largest values, would be said to have "large" incisor-mandibular plane angles.

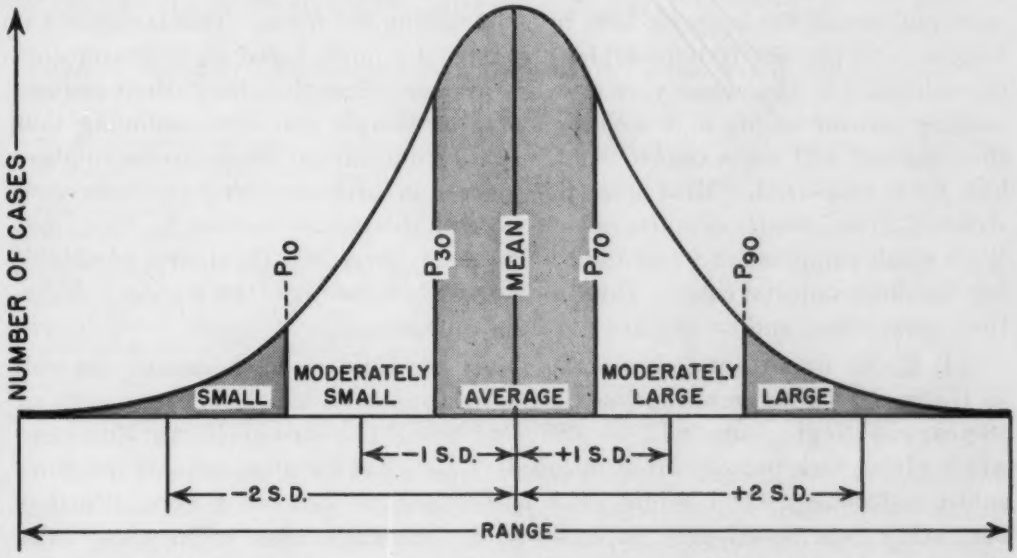

Fig. 1.—A comparison of certain percentiles and standard deviation units for a large sample distribution.

An alternate approach is to use the standard deviation to describe variability from the average or mean. In general terms, six standard deviations, three above the mean and three below, describe the variability. Fig. 1 shows a comparison of these two approaches for description of a theoretical normal distribution where sample size is adequate. Besides being convenient, the percentile ranking approach is more meaningful where an asymmetrical distribution exists. Further, this approach emphasizes that a norm is not a single

value but a range of values. Such descriptions make one conscious of existing variability and reduce a tendency to think of the average as a goal in treatment planning.

How is the norm used? From the foregoing, it can be seen that the proper use of a norm is for description and not for evaluation. The example given would describe an incisor-mandibular plane angle of 100 degrees as "large," since over 90 per cent of the 13-year-old girls in Chicago would have a smaller angle. Whether or not this is regarded as excessive is a diagnosis or evaluation based on the orthodontist's judgment. His judgment should be made, in part, on this description of the angle, but it should also include evaluations of facial profile (for example, prominence of chin point, facial angle, Frankfort-mandibular angle, soft tissue contours), occlusion (for example, molar relationship, amount of crowding or spacing of the teeth, size of teeth), parental features, racial background, and muscle habits. These evaluations must be made by the orthodontist concerned, for the cephalometric norm only describes or ranks the measurements of the patient in relation to the persons used in constructing the norm.

What are some limitations of normative data available today? Since any norm that is employed in the practice of orthodontics will be used to describe a wide variety of patients, it is necessary to inquire into the sample size, age, race, and sex of the subjects used in constructing the norm. This is important because it is physically impossible to construct a norm based on measurements of each child in the country or even in Chicago. Practical limitations require making measurements of a smaller group or sample and then assuming that these figures will approximate what would be obtained if the entire population had been measured. Most available norms in orthodontics have been constructed from small samples, which necessitates some caution in their use. With small samples (say, less than fifty cases), there is little chance of obtaining the more unusual cases. Thus, measures of variability (the standard deviation, percentiles, and range) are not fully representative.

It is also important to know the age of the children in the sample, as well as the racial background and sex. Obviously, many facial characteristics of 18-year-old Negro boys will be different from 10-year-old North European white girls. Our present information does not shed light on some of the more subtle differences which might exist with other races at other ages. Further normative data based only on cases with "normal occlusion" are not fully objective, since they are based on subjectively selected samples.[3] At present, one cannot say how important this point is, but until such information is available, sample size and sample selection must be considered restrictions to keep in mind when normative type data are employed.

The last limitation to be mentioned concerns the reliability of a given measure. Little attention has been paid to the clinical aspects of this problem. Perhaps this is because it seems to insult our ability to make a tracing and record a measurement. Most research workers are aware that two people will seldom make identical measurements for the size of a tooth, for body height,

or for the size of a facial angle. The clinical implications were emphasized for me as I watched a graduate student flip through a cephalometric analysis in less than ten minutes.

I decided to check on the reliability of certain cephalometric measures in a manner that would approach everyday practice as opposed to a research situation, where strict attention must be paid to reliability. I selected three headplates and did a Downs analysis on each.[4] Two weeks later the procedure was repeated. Without indicating my objective, six graduate students and two practicing orthodontists (trained at another school) were asked to trace and record their figures for each of the three films. Thus, there were ten tracings of each film.

Even allowing for the fact that the films contained some obscure landmarks and overlapping incisors, the results were disconcerting. You will note in Table I that for patient A there was a 6.5 degree difference between the largest and smallest facial angles recorded. For patient B the maximum disagreement amounted to 15 degrees, although superimposition of the tracings revealed but 5 degrees disagreement. One person misread the protractor by 10 degrees. Where such misreadings were obvious, the differences in Table I are marked with an asterisk. Note, however, that for patient C the maximum disagreement for the facial angle was 1 degree. This illustrates that the same landmarks are not located with equal reliability in all patients.

TABLE I. RANGE OF DISAGREEMENT FOUND IN CERTAIN CEPHALOMETRIC MEASUREMENTS IN EACH OF THREE PATIENTS WHEN EACH FILM WAS TRACED AND MEASURED TEN SEPARATE TIMES*

MEASUREMENT	PATIENT A	PATIENT B	PATIENT C
Facial angle	6.5°	15.0°†	1.0°
Angle convexity	1.5°	2.3°	4.5°
A-B/facial plane	3.2°	2.5°	2.0°
Mandibular plane	14.2°	10.9°	3.0°
Y axis	10.0°†	3.5°	3.5°
Occlusal plane	8.2°	6.8°	3.5°
Upper to lower incisor	12.5°	13.5°	12.0°
Lower incisor to mandibular plane	6.8°	5.5°	7.5°
Maxillary protrusion	4.5 mm.	4.0 mm.	4.0 mm.

*No specific instructions were given to persons making the tracing.
†Obvious misreadings of the protractor included.

In all cases, incisor angulations were relatively unreliable. Overlapping incisor images may make the apical area hazy. Incisor-mandibular angles show particularly wide disagreement in those cases where the inferior border of the mandible is rocker shaped and fades into the posterior border.

It is interesting to note that lesser disagreements occur with the same person repeating the tracings, when they are done independently with a time interval of a couple of days or more. More detailed discussions of reliability, including the problem of positioning the patient in the head-positioner, can be found in writings by Björk,[5] Werner,[6] and Koski and Kaija.[7]

Once we recognize that two persons seldom will exactly duplicate each other, then the rigid definition of landmarks becomes necessary in construction of a norm. In diagnosis, a 2 or 3 degree difference between cases is negligible

in terms of the hidden errors of measurement. Yet, in the living child, how else can the incisor-mandibular plane angle be measured?[8] Since the most reliable landmarks are not necessarily the ones that lend themselves to the best description of the face, clinically useful cephalometric procedures are not all as precise as some would have us believe.

EVALUATION OF NORMATIVE DATA

Within the limitations outlined previously, a norm is used as a yardstick to indicate what percentage of the population has a larger or a smaller dimension, proportion, or angle. As far as treatment is concerned, a description from a norm carries no implication that a large angle should necessarily be treated to the average or mean. True, there are times when a large (or small) measure is evaluated as excessive, but this judgment is made by the orthodontist in terms of his treatment goals.

Suppose we consider an example of a 10-year-old boy who is 5 feet tall. In terms of height norms, he would be near the ninety-eighth percentile, or more than two standard deviations above the average. A physician assessing the case might utilize this bit of descriptive information and look for symptoms of pituitary gigantism. If they were found, the norm would have aided in diagnosis. If, however, no other symptoms were noted, other factors might be considered in making a diagnosis as to whether a height of 5 feet was normal or abnormal for this particular patient. One factor would be the stature of the parents. Another is that 2 per cent of the 10-year-old boys will be taller than 5 feet. Finally, although the boy will be above average in height when he is an adult, he may not grow as fast as other 10-year-olds, so that by age 21 he might be between the sixtieth and eighty-fifth percentiles.

So it is with a 13-year-old white girl with a large incisor-mandibular plane angle of 100 degrees. On the basis of our present knowledge, this figure should approximate the ninety-eighth percentile and should exceed the mean by two standard deviations. This is a symptom often associated with dental protrusion, but before we can make a judgment as to the desirability of treatment, we should investigate such facets as the parents' profiles, the child's facial profile, her occlusion, tooth size, soft tissue outlines, racial background, and musculature imbalances. In our assessment of the normative data, we must remember that 2 per cent of the 13-year-old female population will show a larger angle. Another factor to consider is that there is some reason to expect this angle to decrease slightly as the patient gets older.[4]

It follows that setting arbitrary limits of ± 5 degrees for normality of incisor-mandibular plane angle is abusing normative type data, that is, using it for evaluation rather than description. Since 5 degrees is the approximate value of the standard deviation, this excludes one-third of the cases and two-thirds of the normal range. The proposed ± 2 standard deviation limits in the wigglegram do the same thing, except that one case in twenty, amounting to one-third of the range, is arbitrarily labeled abnormal. Numerous other factors besides the size of an angle enter into an evaluation of a patient.

In addition to indicating that facial patterns are not necessarily related to satisfactory occlusion or to malocclusion, Table II shows that there is little consistency in facial pattern from age to age, and that individual cases deviate markedly from the average pattern. These data were taken from headplates of the first twenty-eight girls to reach the age of 13 in the Facial Growth Study at the State University of Iowa. Although these data are from a small sample and are preliminary, a brief description of the sample is in order. These girls are of Northwest European ancestry and were entirely unselected as to dental conditions when they entered the study at 4 years of age. All headplates were taken within two weeks of the birth anniversaries of the children and all were obtained in a similar manner. The same definitions of landmarks were used at 5 years and at 13 years. Reliability was controlled to the extent that each film was measured twice with a Universal drafting machine to 5 minutes of a degree. If the recorded angles agreed within 2 degrees, the average of the two was taken as the "true" measure. Where disagreement exceeded 2 degrees, a third measure was taken and the three were averaged unless there was an obvious misreading of the instrument, in which case the offending figure was discarded.

TABLE II. AVERAGES AND EXTREME VALUES OBTAINED FROM TWENTY-SEVEN NORTH EUROPEAN WHITE GIRLS MEASURED AT 5 AND 13 YEARS OF AGE*

MEASUREMENT	SUBGROUP*	MEAN		RANGE		EXTREMES IN INDIVIDUAL CHANGES FROM 5 TO 13 YEARS
		5 YEARS	13 YEARS	5 YEARS	13 YEARS	
Facial angle	Normal	82.9	84.9	77.1-86.4	80.9- 87.5	- 2.5 + 6.8
	Malocclusion	82.9	84.2	77.6-86.6	80.1- 90.9	- 2.7 + 9.7
	Treatment	82.6	82.3	76.4-85.9	77.4- 88.7	- 5.2 + 3.4
Frankfort-mandibular angle	Normal	31.6	30.7	26.5-37.7	21.2- 37.2	- 9.8 + 4.4
	Malocclusion	27.2	27.3	21.4-36.7	16.5- 35.7	- 7.6 + 5.7
	Treatment	30.5	32.0	22.0-41.3	23.5- 38.0	- 6.0 + 8.3
Y axis	Normal	60.5	62.4	56.4-64.9	58.2- 72.0	- 3.9 +11.5
	Malocclusion	61.4	62.2	55.8-67.6	56.0- 68.2	- 5.6 + 7.7
	Treatment	59.4	63.6	55.3-64.3	57.2- 70.3	+ 0.6 +10.1
Angle of convexity	Normal	12.2	5.7	6.5-17.8	1.7- 11.4	-10.7 + 1.3
	Malocclusion	9.6	4.0	5.5-14.3	1.6- 11.2	- 8.6 - 1.9
	Treatment	13.2	9.8	6.9-17.5	0.7- 17.9	- 7.0 + 1.5
Lower incisor—mandibular plane	Normal	86.1	91.3	77.0-94.5	83.9- 99.6	- 2.5 +15.5
	Malocclusion	87.5	97.3	76.9-94.6	90.1-110.1	- 3.4 +16.7
	Treatment	84.5	94.4	76.2-97.9	70.9-105.4	+ 2.3 +17.3
Sella—nasion—pogonion	Normal	75.8	79.7	70.3-81.1	76.6- 83.2	- 1.3 + 7.2
	Malocclusion	75.9	77.9	74.3-77.9	74.3- 82.2	0.0 + 6.4
	Treatment	74.3	76.9	71.3-77.0	71.7- 80.4	- 0.9 + 6.4

*Extremes in amount of individual change between 5 and 13 years are shown. Subgroups include ten normal occlusions, seven malocclusions, and ten malocclusions treated or under orthodontic treatment.

The occlusion was classified at age 13 into three categories. There were ten normal occlusion cases, each with very satisfactory alignment and interdigitation. There were seven malocclusion cases, of which three had a Class I molar relationship and four showed a Class II molar relationship. Of the

ten cases treated or receiving treatment, five had congenitally missing premolars (illustrating the instability of small samples), three were Class I, and two were Class II at the time of treatment. One of the Class I and two of the Class II cases were treated with premolar extraction.

The most outstanding feature of the data in Table II is similarity of the means and of the ranges, despite the fact that none of the subgroups contains more than ten cases. The facial plane angles, Frankfort-mandibular angles, and even the incisor-mandibular plane angles are similar, especially when viewed in terms of the variation between individuals for each of the three subgroups. This illustrates that persons with normal occlusions and persons with malocclusions cannot routinely be separated by cephalometric measures. It lends support to the point that persons with malocclusion may have facial patterns that in many respects are similar to those with good occlusion. The orthodontist must evaluate, making use of these descriptions, but he should remember that such evaluations are subjective and are not carried in the cephalometric norms themselves, which are largely independent of occlusal status.

The last point to note is the marked variation in facial growth between subjects from 5 to 13 years of age. It has been shown by Lande[9] that individual patterns of facial growth deviate markedly from the average. For this sample, the average facial angle increased less than 2 degrees between 5 years and 13 years. Examination of the last two columns of Table II reveals one case of normal occlusion which showed a decrease of 2.5 degrees, while another case showed an increase of 6.8 degrees over this same eight-year period. The facial angles of the malocclusion group and the treated group showed similar averages and similar individual deviations from the average pattern.

From 5 to 13 years, the average Frankfort-mandibular angle changed less than 1 degree, although one girl showed a decrease of 9.8 degrees and another showed an increase of 4.4 degrees. Individual changes in the angle of convexity and the sella-nasion-pogonion angle also deviated markedly from the average pattern. Such individual deviations exist for all other facial measures which have been studied to date.

The permanent lower incisors show considerably more labial inclination, on the average, than their deciduous predecessors. Again, there is marked variability of pattern. One case shows a decrease of 2.5 degrees in angulation while another shows an increase of 16.7 degrees. Thus, it can be seen that the individual pattern is difficult to predict over this age span. Although this is probably less true at older ages, the importance of recognizing variation in patterns of growth is obvious in diagnosis and treatment planning.

SUMMARY

1. Most available cephalometric norms describe faciodental traits with reference to the variability of the trait in a population.

2. Clinical use of these norms is thus appropriate for describing or ranking the patient in terms of the norm. It is abusing the norm to use it alone for evaluation in diagnosis, or to use the average as an objective in treatment planning. A norm is not a substitute for professional judgment.

3. A norm is not a single value, but a range of values. Thus, norms constructed in terms of percentiles, such as the ones used in height and weight norms, have certain advantages. They are easy to use and understand. They are usable whether there is a normal or an asymmetrical distribution. Since variability is emphasized, use of percentiles probably reduces a natural tendency to think of the average as a treatment goal.

4. Until we can construct a larger body of knowledge, our normative use of present cephalometric data should recognize some limitations. Sample sizes of most studies are too small to represent fully the variability of a population. Also, the samples have usually been subjectively selected; for example, on the basis of normal occlusion. The importance of this, as well as differences due to age, sex, and race, is yet to be adequately explored.

5. When using cephalometric data, it is very important to recognize that two persons will seldom duplicate each other exactly in tracing or measuring. Individual orthodontists, and also the same orthodontist on different occasions, will often disagree by several degrees.

6. There is such wide variability between individual persons that most cephalometric measures are not diagnostic within themselves. It is abusing normative data to set arbitrary diagnostic limits of abnormality at one or even two standard deviations from the mean.

7. Some children with normal occlusion will have angulation measurements similar to the malocclusion cases. Many aspects of facial pattern do not appear to be related to the presence of a good occlusion or a malocclusion.

8. Individual deviations from the average pattern of growth are marked. Thus, the ability to predict facial growth in different persons varies considerably and does not provide a stable basis for treatment planning on the basis of present knowledge for the period between the ages of 5 years and 13 years.

CONCLUSION

Since current norms are not in themselves diagnostic, and since routine cephalometric measures are not all as reliable as desired, the question becomes: "Do cephalometric data of the normative type have a role in orthodontics today?" In spite of the limitations outlined, I believe so. Those data available do provide reference frames that are definite aids. These yardsticks may be a bit elastic at present, but they are far better than no yardstick. Knowledge is growing and our normative data are becoming stronger. Within another decade, our cephalometric and normative data should be even more complete and take into account age, sex, and possibly racial differences, as well as providing a better understanding of individual patterns of growth.

If we recognize the role of norms in orthodontics, we will not be disappointed in our yardsticks. As our knowledge grows, I am certain that the future will find orthodontists utilizing norms far more than today.

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A RE-TREATED CLASS II, DIVISION 1 FAILURE

Report of a Case

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THE patient was a girl aged 15 years 8 months.

Diagnosis.—Because the patient advised us that she had been under orthodontic treatment for more than three years and that during a part of that time she had used Class II elastic therapy, and because of the general appearance of the models and photographs at the time we made our first records, we concluded that the Angle classification was Class II, Division 1.

Further appraisal of the models indicated that the mandibular buccal segments were in mesial axial inclination, with contacts broken markedly in the first premolar-canine areas on both sides; the first premolars were forced buccally and the left canine was in lingual position. In addition, there were contact breaks in the lower incisal segment, and those teeth were procumbent and forward of the mandibular base. When occluded, the models showed the maxillary second molars locked buccally to the lower arch. The upper incisal teeth were in an overjet position of about 5 mm. with some slight contact breaks in that area. The anterior overbite was deep, with the mandibular incisors striking the palatal soft tissues at the gingival aspect (Fig. 1, *A*).

The oriented photographs indicated upper and lower lip protrusion, and the anterior view showed lips that were prominent (Fig. 2, *A*).

The lateral oriented cephalograms, appraised acording to Tweed, measured the Frankfort mandibular angle at 28 degrees, the incisal mandibular angle at 100 degrees (which confirmed the appraisal of the models, wherein the mandibular incisors were indicated as being tipped labially off basal bone), and the Frankfort-mandibular incisal angle at 52 degrees, indicating the possibility of improving facial esthetics by uprighting the lower incisors lingually (Fig. 3, *A*).

The over-all picture was one of teeth too far forward and tipped labially off of base, with considerable crowding in the mandibular tooth arch, and upper and lower lips in protrusion. For these reasons, this was considered an extraction case, and the four first premolars were to be extracted as part of the orthodontic procedures.

Presented before the Central Section of the American Association of Orthodontists, Chicago, Illinois, Oct. 1, 1956.

History and General Clinical Picture.—At the time the patient presented herself, she was in apparent good health, although there was considerable caries (in nine places). The patient had had some of the usual childhood diseases between the ages of 7 and 12 years.

Etiology.—We could find no history of detrimental habits that might have caused the malocclusion. It was felt that the jaws were too small to contain all the teeth in their correct position relative to the mandible and maxilla.

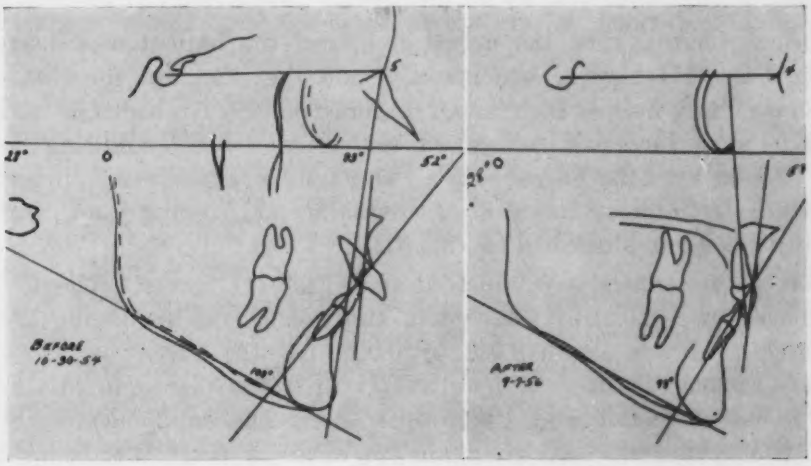
A. *B.*

Fig. 1.—Models before (*A*) and after (*B*) treatment.

Plan of Treatment.—The general plan of treatment hinged on the removal of four first premolar teeth, which were ordered extracted. Bands carrying rectangular buccal tubes were placed on the second molars, and all the first molars, second premolars, and canines carried wide edgewise bracket bands. To gain bracket engagement, 0.016 and 0.018 arches were used, and then were were replaced by 0.020 arches carrying a distended compressed coil from canine to canine in both arches, to move the canines distally. These arches

A. *B.*

Fig. 2.—Oriented photographs before (*A*) and after (*B*) treatment.



A. *B.*

Fig. 3.—Tracing of lateral headplate before (*A*) and after (*B*) treatment.

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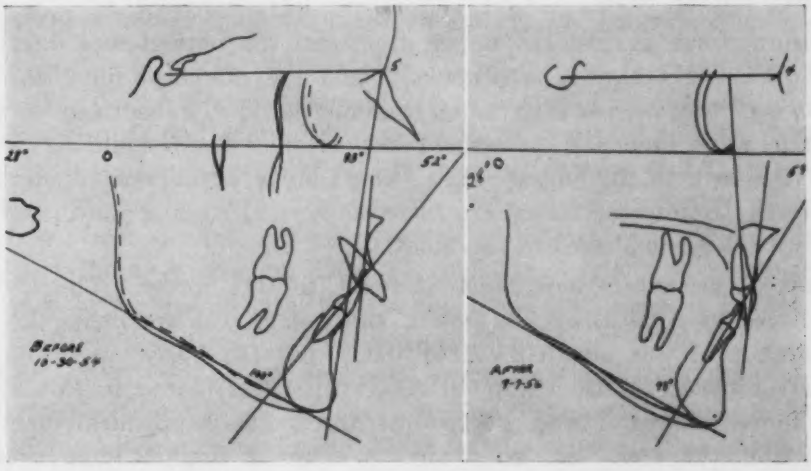


A. *B.*

Fig. 3.—Tracing of lateral headplate before (*A*) and after (*B*) treatment.

were not tied back to the second molar tubes, as suggested by George Englert, but the coils were kept active by distention and by the lips. At the same time, the buccal positions of the upper second molars were corrected by cross elastics from the buccal side of the upper second molars to the lingual side of the lower second molars, by means of hooks soldered to the bands.

When all the canines were back against the second premolars, all the incisors were banded with narrow edgewise brackets on all the incisor bands, except the upper central incisors which carried wide edgewise brackets. Again, bracket engagement was obtained by using, in order, 0.016, 0.018, and 0.020 arches, and then the incisal spaces were closed with tip backs in both arches and short coils against stops 2 or 3 mm. anterior to the buccal tubes, and then the coils were compressed to activate.

When the space closure was completed in the incisal segment, upper and lower 0.020 by 0.025 arches were placed, with tip backs similar to those existent in the 0.020 arches that were just discarded. The maxillary arch was then replaced by a 0.022 by 0.028 arch for stabilization. The mandibular tip back bends were increased, and Class III elastics were used to establish mandibular anchorage. The maxillary anchorage, at this time, was augmented

Fig. 4.—Heavy rectangular maxillary arch with lingual root torque in the upper incisal segment and finger springs against the labial aspect at the gingival region of the upper central incisors.

by extraoral force against the upper arch, and the patient was instructed to wear the Class III elastics continuously, and the extraoral force as much as possible, certainly no less than fourteen hours daily. Tip backs in the mandibular arch were increased at subsequent visits. The stabilizing arch was always tied back to the buccal tubes. Mandibular anchorage (uprighting the buccal teeth, tipping the buccal crowns distally, and tipping the incisal crowns lingually) was accomplished in two months.

Class II mechanics now replaced the Class III forces. The lower arch was replaced by a 0.022 by 0.028 arch, and became the stabilizing arch. The upper arch used was also a 0.022 by 0.028, but the buccal segments of this arch were reduced in size. Lingual root torque was placed in this arch wire in the incisal segment, and the torque force was supplemented by finger springs from the arch wire gingivally to create a lingual force against the upper central incisor crowns on the labial side at the gingival margin (Fig. 4). As mesiodistal adjustment of the tooth arches occurred, the tip backs and torque in the maxillary arch were increased. In addition to using the

Class II elastics continuously, the patient was again instructed to use the extraoral force against the maxillary arch. Class II mechanics were completed in about two months.

At this time, bands were removed from the first molars, second premolars, and canines. Upper and lower 0.020 by 0.025 arches with short coils were placed to close band spaces and to position the incisor teeth better. This process was completed in two months, when all appliances were removed (Fig. 5).

Lower lingual canine-to-canine and upper Hawley acrylic retainers were placed at this time. Total duration of active treatment was nineteen months.

Progress of the Case.—The progress of the case, we felt, was excellent, due primarily to the superb cooperation of the patient. At one time during treatment, some bands were removed because of caries and approximately six weeks' time was lost. Total chair time, including placing of retainers, was approximately thirty hours. The total number of appointments, including all time from the first consultation to the placement of retainers, was forty.

Fig. 5.—Appliance used for finishing and closure of band spaces and seating of cusps.

Secondary Treatment.—As stated before, lower lingual canine-to-canine and maxillary acrylic Hawley retainers were placed. The lower right third molar has been removed, and the lower left third molar has been ordered extracted.

Results Achieved.—According to the cephalometric tracings, the lower incisors were uprighted from 100 degrees to 93 degrees, and the Frankfort-mandibular incisal angle was increased from 52 degrees to 59 degrees. The upper and lower first permanent molars were moved mesially but slightly and in this movement the crowns were tipped distally, improving their axial inclination. Point A was set back 2.5 to 3 mm. The upper incisors were tipped back 30 degrees as measured to the Frankfort horizontal. The Frankfort-mandibular angle was unchanged at 28 degrees (Fig 3, *B*). It is questionable that growth played a part in any of these changes.

Interpreting the changes in this case, based upon the models in occlusion, the cuspal interdigitation and mesiodistal relationships of the teeth have been adjusted. The buccal teeth have been uprighted. The anterior overbite has been opened so that now the lower incisors do not occlude with the palatal soft tissues. The anterior overjet has been completely reduced. The midlines,

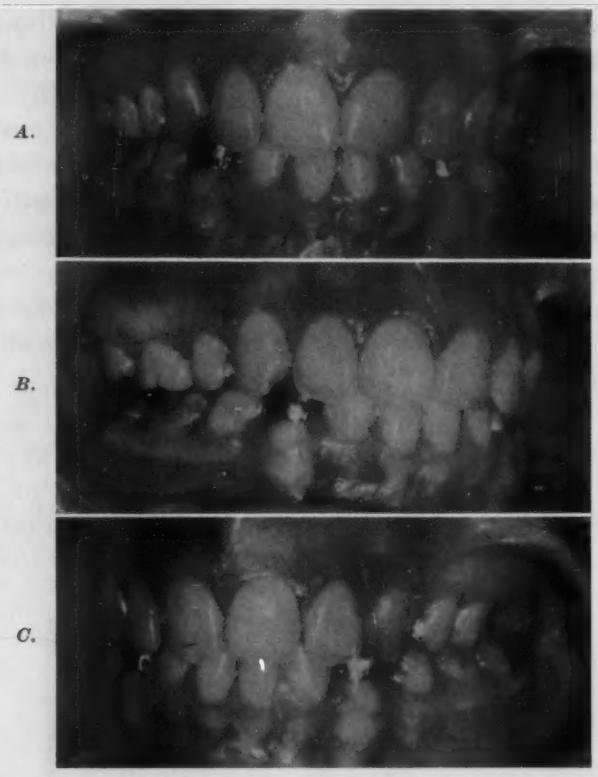
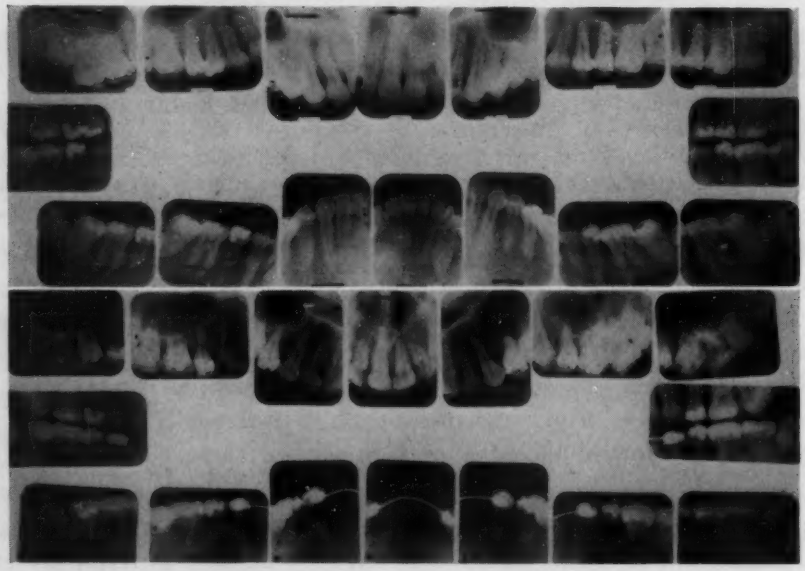


Fig. 6.—Intraoral photographs (*A*, front view; *B*, right; *C*, left) showing cuspal interdigitation after some settling.

A.



B.

Fig. 7.—Intraoral roentgenograms before (*A*) and after (*B*) treatment.

upper to lower teeth, which were off about 1 mm. originally, have been completely adjusted (Figs. 1, *B* and 6). All contact relations have been reestablished.

The oriented photograph shows a reduction of the upper and lower lip protrusions. The anterior view indicates that the lips are thinner than at the beginning of treatment. The over-all appearance is one of improved facial esthetics (Fig. 2, *B*).

The intraoral radiograms, while subject to varying radiographic techniques, indicated some apical root resorption, especially in the upper incisal area. While we feel that this condition is not marked, it is, nonetheless, a scar of treatment, and should be considered when appraising the over-all value of the orthodontic therapy (Fig. 7).

Observations and Conclusions.—If the results of treatment are considered satisfactory, it would seem that the diagnosis was correctly made, and that the therapeutic procedures were carried through to completion. It is felt that the preparation of mandibular anchorage played a very important role in the treatment procedures and enabled us, in those procedures, to maintain, fairly well, the position of the buccal teeth as we carried the canines distally and the incisors distally and lingually, and then adjusted the mesiodistal relation of maxillary to mandibular teeth. We feel quite strongly that the removal of two upper first premolars would not have allowed for an adequate adjustment, for the position of the lower incisors would have prohibited the correction of axial inclinations. We feel, further, that the previous treatment may have increased the difficulties of the case.

Posttreatment Findings.—The case has just been completed; therefore, we can but guess as to the future. If we are allowed to venture such a guess, we may hope for improved settling of the denture (Fig. 6). In addition, there also may be some slight overlapping in the lower incisal segment in the future.

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PRESENT CONDITION OF ORTHODONTICS IN JAPAN

HIROSI IWAGAKI,* TOKYO, JAPAN

THE present condition of orthodontics in our country may be described from two different aspects: (1) how orthodontics is taught in dental colleges and (2) the manner in which orthodontics is practiced by dentists.

In 1955, with a view to appreciating properly the actual condition of orthodontics in the field of education in Japan, I sent to all dental colleges questionnaires covering the following twelve items:

1. Date when the department of orthodontics was established.
2. Number of staff members who have had specialist training.
3. Number of professors and others on the teaching staff in the department.
4. Number of students.
5. Hours for lectures on orthodontics.
6. Hours for laboratory work.
7. Subjects of lectures in detail.
8. Subjects of laboratory work.
9. Subjects of clinical training.
10. Number of patients who received treatment during the preceding year.
11. Subjects of research work of the staff of the department.
12. Research projects by the staff.

For the purpose of comparison with conditions in the United States, I made use of the various data that I personally obtained in 1950 direct from dental colleges in the United States and the report of the Committee on Undergraduate Orthodontic Teaching of the American Association of Dental Schools, 1950. I take this opportunity to express my deep and abiding gratitude to the staff of the dental colleges in the United States for their invaluable cooperation and particularly to Dr. Samuel Hemley of New York University for his unusual kindness in furnishing me with a full copy of the report referred to above.

The actual condition of orthodontic teaching in Japan, as compared with that in United States, appears to me as follows.

Read before the First Asia Dental Congress, Tokyo, Japan, Oct. 14, 1955.

*Professor, Department of Orthodontics, School of Dentistry, Nihon University; Vice-President, the Japan Orthdontic Society.

A. *Lectures.*—Lectures are given on the following subjects in practically all colleges in Japan: (1) history, significance, aims, and effects of orthodontics; (2) growth and development; (3) forces of occlusion; (4) etiology of malocclusion; (5) classification of malocclusion and diagnosis; (6) orthodontic appliances; (7) tissue response; (8) timing of treatment; (9) physiology of muscle and myofunctional therapy; (10) treatment planning and prognosis; and (11) prevention of malocclusion.

I understand that in the United States, generally speaking, more or less identical subjects are taken up in the dental colleges; the lecture hours per year, to be sure, vary from 14 to 112 hours, whereas in Japan the colleges allocate from 40 to 60 hours of lectures for the above subjects. Compared with a school which has only 14 hours of lecture, the colleges in Japan may be said to be advanced, but it is equally safe to say that they are far behind the school which gives 112 hours. Fig. 1 shows, however, that average total hours of lectures are, in both countries, approximately 50 hours and I submit that, broadly speaking, there exists no great difference between the two countries.

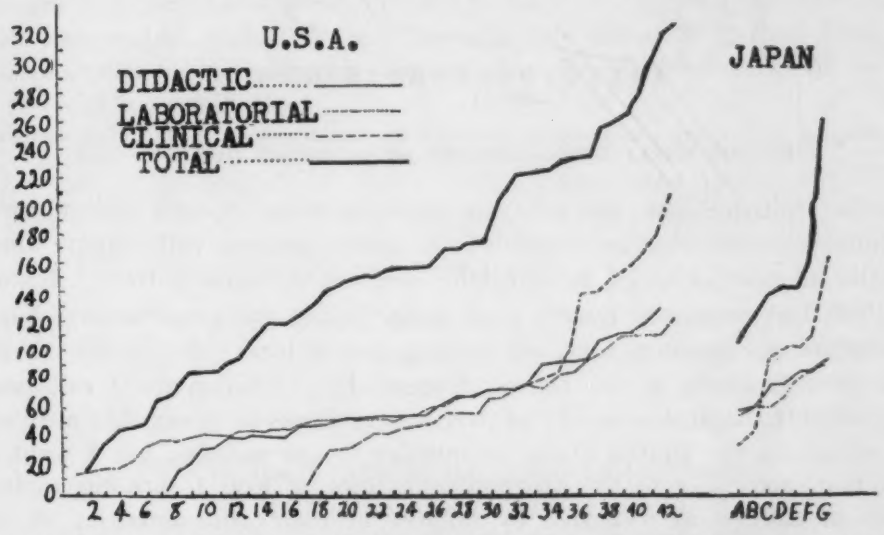

Fig. 1.—Number of hours allocated for lectures, laboratory training, and clinical training in the dental colleges in Japan as compared with that in the United States. Perpendicular line show number of hours. United States colleges are represented by numerals on horizontal line; Japanese colleges are represented by letters *A* through *G*. (Courtesy of Dr. Samuel Hemley.)

B. *Laboratory Training.*—The subjects of laboratory training in our dental colleges are generally as follows: (1) orthodontic impression and casts; (2) wire bending and freehand soldering technique; (3) lingual arch; (4) labial arch; (5) pin and tube appliance; (6) Norwegian system of orthodontic treatment; (7) orthodontic plate; and (8) retainer.

Allocated hours are from 48 to 68 hours, with an average of 58 hours; Fig. 1 shows that in the United States seven schools do not maintain laboratory training, while one college allocates no less than 180 hours; it also shows that a great many colleges allocate about 60 hours and I probably am safe in concluding that no great difference seems to exist between the two countries.

C. *Clinical Training.*—In Japan, clinical training is adopted as a part of the regular course in all colleges, without exception. In the United States, I find that nineteen colleges allot no time for clinical training while one college allots as many as 192 hours. However, since the average time allotted for clinical training may be estimated at 70 hours, as shown in Fig. 1, I may say that, roughly speaking, no great difference appears to exist between the two countries.

With regard to requirements, certain colleges in the United States have their students participate in the treatment of patients, while in others the students merely observe the treatment performed by instructors or students in graduate courses. In this respect, again, no great difference seems to exist between the two countries.

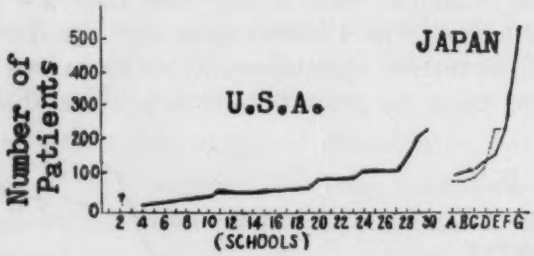

Fig. 2.—Number of patients who received treatment in dental colleges in Japan as compared with the United States. (Courtesy of Dr. Samuel Hemley.)

In the United States, the policy of administration of each college seems to be eminently individualistic, which is in sharp contrast with Japan where practically all colleges adopt substantially one and the same pattern. I must admit that the comparison I have tried so far is far from satisfactory, but I shall venture my opinion that, all in all, our colleges are similar to the medium-grade colleges in the United States. By "medium-grade colleges," I do not mean to designate quality of particular colleges or to say that medium-grade colleges in the United States are similar to our colleges, but I want to suggest that, according to the diagrammatic lines in Fig. 1 showing various activities of colleges as measured by number of hours, the activities of our colleges, as compared with those of the colleges in the United States, occupy the medium position.

It should be pointed out, in this connection, that the comparatively small number of hours allotted for orthodontics in quite a number of colleges in the United States, as shown in Fig. 1, does not indicate that the importance of orthodontics is not sufficiently recognized in those colleges. On the contary, it would appear that the study of orthodontics is considered as one of the major items in graduate courses, with the result that the number of hours allotted for orthodontics in undergraduate courses has been proportionately reduced.

The dotted line in Fig. 2 shows the number of patients who received treatment in dental colleges in Japan in 1951 and the unbroken line shows the corresponding data for 1955; the line showing the number in the United States (on the left) is based on the figures taken in 1950.

It may not be quite fair to make a comparison on the basis of figures taken in different years, but the fact that the number of patients actually exceeds 500 constitutes, in itself, a noteworthy activity on the part of dental colleges in Japan. I must confess that I am inclined to believe that, in number of patients and also in the quality of treatment given, the dental colleges in Japan are not inferior to those in the United States as far as orthodontics is concerned.

The condition of orthodontics as practiced by dentists in Japan is, I must admit, simply disgraceful.

I understand that in the United States approximately 3 per cent of dental practitioners are recognized specialists in orthodontics. On the basis of this percentage, Japan should have about 1,000 specialists, but actually there are only one or two in the whole country; even if I include those who made a special study of orthodontics in colleges and have since performed orthodontic procedures while working as general practitioners, the number does not exceed 100, and possibly it is as small as 50.

For the purpose of ascertaining how the patients are treated by practitioners in Japan, I sent questionnaires to about 500 dentists domiciled throughout the country, selected by an indiscriminate sampling method from among the practitioners in the Japan Dentists' Register. The substance of the replies I received is as follows:

1. Have you any patients who wish orthodontic treatment done?

Yes	89% (169/190)
No	11% (21/190)

2. If you have, how do you treat them?

A. Personally treat them myself	57% (95/169)
Easy cases only	69% (66/ 95)
Difficult cases too	19% (18/ 95)
No answer	12% (11/ 95)
B. Refer them to the department of orthodontics of a college, or the experts, or those who can perform orthodontic service	20% (34/169)
C. Give a polite refusal on some pretext or other	6% (10/169)
D. No answer	17% (30/169)

3. In treating orthodontic patients, do you treat them for your interest or study, or do you think it yields adequate return?

A. For my interest	12% (11/95)
B. For my study	40% (38/95)
C. For publicity	3% (3/95)
D. For actual profit	15% (14/95)
E. Others	30% (34/95)

It will be seen from the answers recapitulated above that difficult orthodontic cases are left unattended (especially in rural districts, although not specified in the recapitulation) and that the practitioners who state that they give orthodontic treatment "for actual profit" are in the absolute minority and the majority of practitioners state that they give orthodontic treatment "for my interest" or "for my study."

That a number of practitioners give orthodontic treatment "for my study" or "for my interest" may be satisfactory fact from some points of view, but for a profession which has a bearing on national health, this state of affairs can hardly be called satisfactory and will abundantly illustrate how immature is the general understanding of orthodontics.

Fig. 3 shows fees charged by the colleges only; I regret that I have no available data regarding fees charged by practitioners, but it may be inferred from Fig. 3 that orthodontic practice yields no adequate return in our country.

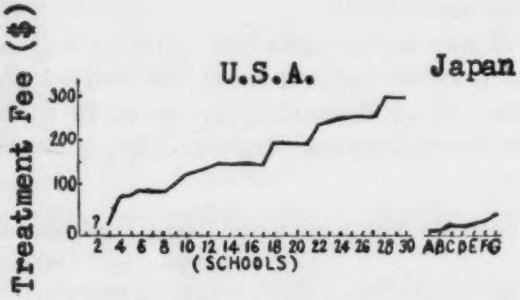

Fig. 3.—Fees charged for orthodontic treatment by the dental colleges in Japan as compared with the United States. (Yen converted into United States dollars @ 360 ¥ per dollar.)

I have tried so far to describe the present condition of orthodontics in our country from two difficult aspects, namely, as it is studied in the dental colleges (undergraduate course inasmuch as graduate course, in the case of Japan, has just been started) and how orthodontic treatment is being followed by general practitioners. I hope that I have demonstrated that from the first aspect Japan makes a fairly commendable showing but from the latter aspect she cuts a poor figure; in other words, Japan is limping along as far as orthodontics is concerned. How can we attend to this malady? This is the problem with which we have to grapple.

I might add that one bright spot in this gloomy picture is that the Japan Dental Association has lately organized a committee for the purpose of establishing the specialist system, and it is confidently expected that this system will come into force in the near future along with the gradual amelioration of the general economic condition of this country.

As for orthodontic research in this country, we have seven dental colleges and one private laboratory for the study of orthodontics; as a matter of illustration to show their activities, the following subjects of studies which have lately been published may be mentioned. (I have selected, at my discretion, two studies for each college, from the replies to my questionnaires.)

From Tokyo Dental College:

1. Study on the transition from deciduous denture to mixed denture.
2. Follow-up studies of treated cases.

From Kyushu Dental College:

1. Studies on the function of mastication.
2. On the so-called "Myo-plate."

From Tokyo Medical and Dental University:

1. Experimental studies on the functional process of the Norwegian system.
2. Experimental studies on the changing mechanism of alveolar bone following tooth movement by lead acetate vital staining.

From the School of Dentistry, Nihon University:

1. Self-correction of malocclusion.
2. Hereditary influence of face form and malocclusion.

From Nippon Dental College:

1. Roentgeno-cephalometric cranio-facial morphology of Japanese.
2. Form, size, and functional anomalies of the tongue.

From Osaka Dental College:

1. Clinical studies on the active plate.
2. Biometric studies on the face and jaw.

From the School of Dentistry, Osaka University:

(Only recently opened, no subjects mentioned in their reply to my questionnaire.)

From Iwagaki Laboratory for Study of Orthodontics:

1. Serial studies of the growth and development of the face and jaw.
2. Clinical studies on the artificial denture to deciduous arch.

I hardly need say that, compared with the dental colleges in the United States, we are, as a whole, decidedly inferior in number of workers, in available funds, and in actual achievements.

However, I personally am of the opinion that some of those studies have attained such levels as may be compared favorably with those in Europe or America. Unfortunately, all those studies are written in the Japanese language and published in Japanese periodicals; had they been done in an international language, they would have called forth much wider attention. We should certainly try to publish the results of our studies in some international language in order that we may contribute more effectively to the advancement in this field.

As regards societies or associations devoted to orthodontics, we have, as an international organization, the Japan Orthodontic Society which is a component society of the Internationl Orthodontic Congress; at home we have the Tokyo Orthodontic Society and the West Japan Orthodontic Society. Also, the Japan Orthodontic Society has published, since 1932, its organ entitled *The Journal of Japan Orthodontic Society.*

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THE INCIDENCE AND ETIOLOGY OF TOOTH ANKYLOSIS

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THIS is a quantitative study on the incidence and etiology of tooth ankylosis. Tooth ankylosis is the fusion of the cementum of a tooth with bone. This obviously cannot occur as long as the periodontal membrane is intact. The periodontal membrane is a sort of double periosteum, being the fibrous tissue covering of both cementum and bone. A defective or discontinuous periodontal membrane is therefore a condition precedent to tooth ankylosis. This conceivably may occur because of an incomplete development of the periodontal membrane, because of a local lysis, or because of a local ossification of part of the membrane. Whatever the cause, the effect is to obliterate a portion of the bone surface and, since bone can grow only by surface deposition, bone growth and therefore further eruption of the tooth are halted (Fig. 1). The approximating teeth that are unaffected continue erupting, tilting toward the ankylosed tooth, leaving the latter at a lower level and, in some cases, eventually becoming "submerged."[4]

Tooth ankylosis may occur either before or after emergence into the oral cavity. It may involve any tooth, deciduous or permanent, but the tooth by far most commonly affected is the deciduous second molar. Mechanical trauma is the generally accepted cause for this condition, although masticatory injury can hardly account for the nonerupted ankylosed tooth. If masticatory trauma were the cause, why do we not find a greater incidence of ankylosis in the adult dentition where the stresses are greater than in the deciduous or the mixed dentitions? There are other phenomena that reflect doubt upon a traumatic etiology. There is no evidence that trapeze artists or other entertainers who perform weight-lifting tricks with their teeth are prone to ankylosis. Further, animal experimentation in which excessive force was directed along the long axes of the teeth was found difficult to maintain in this direction and never resulted in ankylosis, while replantation following extraction often resulted in tooth ankylosis.[2]

An alternative explanation of the etiology of tooth ankylosis is a disturbed local metabolism causing an alteration of the periodontal membrane and leading to the fusion of the bone with the cementum. This disturbed local metabolism may result in a lysis of the membrane at some point, in which case the bone thus denuded is exposed to cementum similarly denuded and ankylosis could follow; or the disturbance might be characterized by an ossification of the membrane at some place, thus effectively uniting bone and cementum.

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With these factors in mind, a novel statistical test was proposed to compare the relative validity of the traumatic etiology hypothesis with the hypothesis of a disturbed local metabolism.[1] In mouths with exactly two ankylosed deciduous

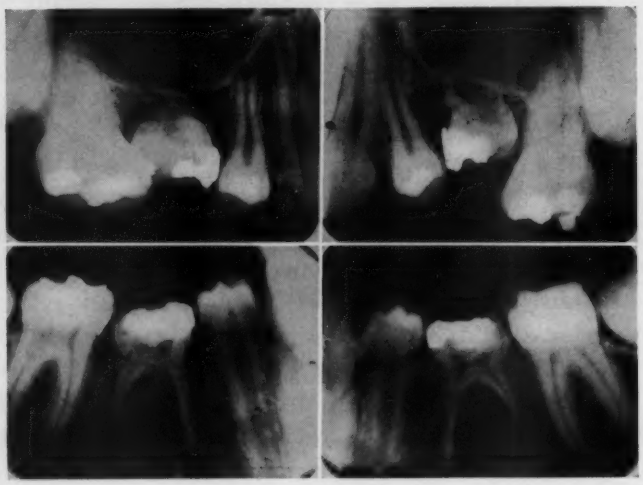


Fig. 1.—Four ankylosed deciduous second molars in the same mouth. Note the effects on the approximating teeth.

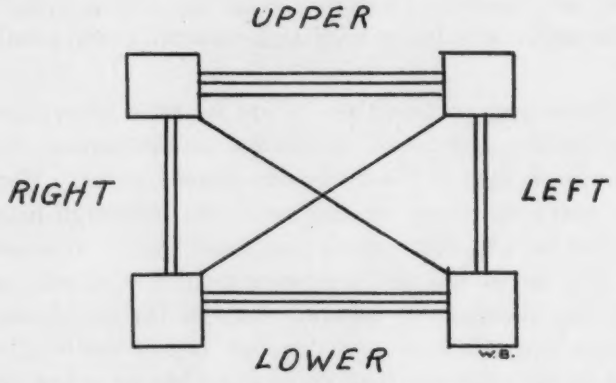


Fig. 2.—Distributions of pairs of ankylosed teeth. (From Biederman: *Ann. Dentistry*, March, 1953.)

second molars, there are mathematically possible six different distributions, really three pairs (Fig. 2):

1. Cross: upper right-lower left
   lower right-upper left
2. Same side: upper right-lower right
   upper left-lower left
3. Same jaw: upper right-upper left
   lower right-lower left

If the etiology were due to a random or systemic cause, be it a defective formation, a lysis, or an ossification of the periodontal membrane, the frequency

in each of these three categories should be substantially the same. If the cause were a masticatory trauma, the "same side" category should predominate, because any excessive force on a tooth in one jaw would reciprocally affect its antagonists. If the etiology were due to a local metabolic disturbance, such a disturbance would more likely affect both sides of the same jaw because they are more likely to develop in parallel fashion than segments in the opposite jaws.

MATERIALS AND METHODS

The data were obtained from staff members of the Departments of Orthodontics and Pedodontics at New York University, in their respective clinics and private practices. The criterion by which ankylosis was determined was as follows: Unless a tooth was impacted by some intervening tooth or tissue or prevented from reaching the occlusal level because of some pernicious habit, "A tooth which does not maintain its occlusal level with the remaining teeth is pathognomonic of an ankylosis."[3]

The raw data were tabulated in order of frequency in the same mouth, differentiated as between deciduous and permanent, upper and lower, right and left, and tabulated according to position in the mouth. "Pairs" of ankylosed teeth were analyzed according to the test proposed above.

FINDINGS

A total of 221 ankylosed teeth were found in 119 patients. Two hundred and three, or 91.9 per cent, were deciduous and eighteen, or 8.1 per cent, were permanent teeth.

TABLE I. NUMBER OF ANKYLOSED TEETH IN THE SAME MOUTH

NUMBER OF ANKYLOSED TEETH	FREQUENCY	NUMBER × FREQUENCY
1	70	70
2	32	64
3	5	15
4	5	20
5	1	5
6	0	0
7	1	7
8	5	40
Totals	119	221

Table I shows that, of the 119 patients, seventy had but one ankylosed tooth, thirty-two had two ankylosed teeth, and the remaining seventeen patients exhibited three to eight ankylosed teeth each.

TABLE II

ANKYLOSED TEETH	NUMBER	PER CENT	TOTAL
Upper deciduous second molars	36	16.3	
Lower deciduous second molars	90	40.7	57.0%
Upper deciduous first molars	25	11.3	
Lower deciduous first molars	52	23.5	34.8%
Remaining upper teeth	5	2.3	
Remaining lower teeth	13	5.9	8.2%

Table II shows that 91.8 per cent of all the ankylosed teeth were either first or second deciduous molars, with the lower teeth in each category outnumbering the respective upper teeth by better than two to one.

Table III shows the regional distribution of all the ankylosed teeth, arranged according to their positions in the mouth. In addition to the preponderance of the deciduous molars, the bilateral symmetry of right and left

TABLE III. REGIONAL DISTRIBUTION OF ANKYLOSED TEETH

	Upper right 32							*Upper left 34*						
Permanent	1		1				1	1					1	
Deciduous			18	11							14	18		
Totals	1		19	11			1	1			14	18	1	
Position: *Right*	7	6	5	4	3	2	1	1	2	3	4	5	6	7 *Left*
Totals	3	2	44	29				1			23	48	2	3
Deciduous			43	29							23	47		
Permanent	3	2	1					1				1	2	3
	Lower right 78							*Lower left 77*						

sides, both upper and lower, is almost perfect. The upper right segment contains thirty-two ankylosed teeth and the upper left contains thirty-four. The lower right segment numbers seventy-eight ankylosed teeth and the lower left has 77. We see again the disparity in the number of lower ankylosed teeth as compared with the upper teeth, both as to totals and in each category. There is also the graphic demonstration of the small number of permanent teeth ankylosed as compared with the deciduous teeth.

Table IV shows the distribution of "pairs of ankylosed teeth," that is, where there are two of the same kind of tooth ankylosed in the one mouth and no other ankylosed teeth in it. They are tabulated into the six distributions

TABLE IV. DISTRIBUTION OF PAIRS OF ANKYLOSED TEETH

CATEGORY		FIRST DECIDUOUS MOLARS	SECOND DECIDUOUS MOLARS	SECOND PREMOLARS	SECOND PERMANENT MOLARS	TOTALS
Same jaw	Upper	2	1	0	0	3
	Lower	4	16	0	1	21
Same side	Right	0	2	1	0	3
	Left	0	1	0	0	1
Cross		0	0	0	0	0
						28

represented by three categories: "same jaw," "same side," and "cross." A total of twenty-eight such pairs were found, twenty of them being deciduous second molars. It will be noted that, of these twenty-eight pairs, twenty-four were in the "same jaw" category, four were in the "same side," and none were in the "cross" group. A chi-square test gives a confidence level above 99.9 per cent. If the original premises upon which this study was based are right, it must be concluded that the theory of a traumatic etiology is not supported by this study, while that of a disturbed local metabolism is.

A significant question that remains unexplained is the site selectivity of tooth ankylosis; 91.8 per cent of the ankylosed teeth in this study were deciduous first and second molars.

It is probable that the unresorbed deciduous roots that are seen occasionally in adult mouths are from formerly ankylosed deciduous teeth in which the point of ankylosis was near the apex and the rest of the tooth was freed when it was later separated by resorption at a higher point and exfoliated (Fig. 3). Hemley[3] has suggested that the ankylosis of a permanent tooth sometimes may be broken

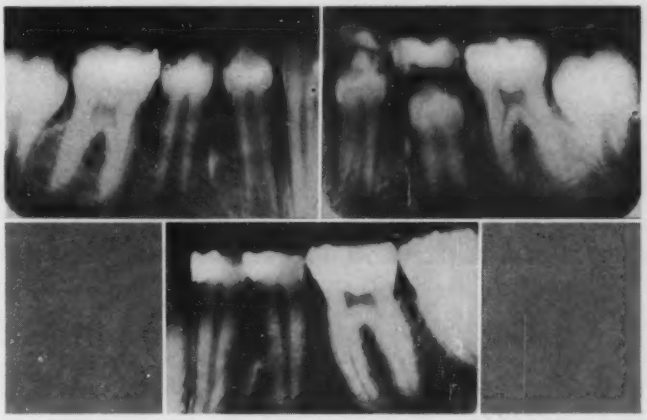
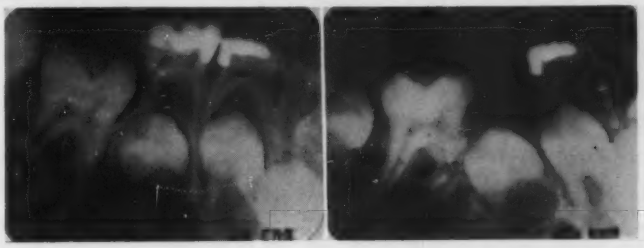


Fig. 3.—Unresorbed root fragments of formerly ankylosed deciduous second molars.



A. *B.*

Fig. 4.—Permanent molar, formerly ankylosed, before (*A*) and after (*B*) it was freed by Hemley's method.

by slightly rocking or luxating the affected tooth; this has proved successful in five of the first eight cases in which this was tried by him (Fig. 4). If the point of osseous-cemental fusion were broken and fibrous tissue were subsequently to intervene, then a more normal periodontal membrane could result and tooth eruption would be resumed.

CONCLUSIONS

1. Tooth ankylosis occurs more than twice as frequently in the mandible as in the maxilla, and far more frequently in the deciduous dentition than in the permanent dentition.
2. Mechanical trauma is probably not the cause of tooth ankylosis.
3. Tooth ankylosis is not caused by a systemic or random etiology.

4. Tooth ankylosis is probably caused by some metabolic disturbance of a local character.

5. A new method for treating ankylosed permanent molars has been presented.

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Orthodontic Profile

MARGUERITE STADELHOFER

THE Architect who builds human lives endows some, more than others, with imagination; from this quality in human beings, ideas and dreams are born. The late Dr. C. V. Mosby, founder of The C. V. Mosby Company of St. Louis, was a person who dreamed such dreams and had such visions, and then proceeded to make these dreams and visions come true.

Early in the century he was inspired by the thought of orthodontics becoming a great specialty. He was first alerted and interested in the subject by the beginnings made in St. Louis by Dr. Angle and his students. In addition to that, he had observed the organization of the American Association of Orthodontists in that city, so he decided to launch a journal which would chronicle the progress and preserve for posterity the record of the growth of the specialty.

This took place in the year 1915, about the time that World War I was at its peak. History was being written in headlines throughout the world. The health professions were engrossed in war work; some orthodontists were being trained in short courses at hospitals, inasmuch as it was hoped that the type of facial splint work later done at Walter Reed Hospital by Eby, Hume, and Ivy on the facial casualties of the war could be done best by orthodontists, whose background would lend itself to that type of operation.

In 1916 there joined the staff of The C. V. Mosby Company Miss Marguerite Stadelhofer, then 20 years of age, a woman with talents which were later to give her renown in the medical and dental publishing fields. She soon became the mainstay of the company's two first journals—the *International Journal of Orthodontia* and the *Journal of Laboratory and Clinical Medicine,* both launched in 1915. Because the *International Journal of Orthodontia* was the firstborn, so to speak, Miss Stadelhofer, as well as Dr. Mosby, took great pride in it. They left no stone unturned that it might not wither and die on the vine. During the war period, many times the going was rough: sometimes there was insufficient manuscript to go to press; again, the quality of manuscript was unsatisfactory; at times, the English composition was so amateurish that an entire manuscript would have to be veritably rewritten before it could be published.

Dr. Martin Dewey was editor in those days, but it was Marguerite Stadelhofer who was responsible for deadlines and make-up and who usually received the head-on impact of something gone wrong. At times she frantically called

Editor's Note: Although this section of the JOURNAL has been set aside for profiles of pioneers in our own profession, we realize that occasionally important contributions to the development of orthodontics have been made by laymen. Thus, it seems fitting that one of our first Orthodontic Profiles should tell of the work of the late Marguerite Stadelhofer, a layman to whom our specialty is greatly indebted.

Dr. Dewey, in Kansas City, and informed him that she did not have sufficient manuscript to go to press, with the deadline only a few days off. Alerted, Martin Dewey sometimes sat up into the wee hours of the morning getting together sufficient material to make up an issue. This is only a sample of the impact of the late Marguerite Stadelhofer on the early history of the *International Journal of Orthodontia.* Her influence started in 1916 and continued up to a few months before her death on Sept. 1, 1956.

Shortly after her employment, Miss Stadelhofer took over all the editorial work of the journals, directing and supervising this and, in addition, many of the production tasks that are carried out behind the scenes before the written word emerges in the form of a book or journal.

Miss Stadelhofer was held in the highest regard by the authors of the company's medical and dental textbooks and by the editors of the scientific journals. One author has written: "She showed a wonderful human understanding of the problems of busy doctors to whom she gave unstintingly of her time and advice." Another states that he had "many occasions to benefit from the keen insights of her long experience in medical journalism." From those who worked with her in her department has come this word:

"Many have spoken before her death, as well as since, of her contribution in various fields. Nothing could please her more than to be told that she was a link in the chain of endeavors which have relieved pain and suffering and prolonged the life and happiness of human beings. We are glad to say she had the satisfaction of knowing that men and women in the medical and dental professions believed this of her through word received before her death as well as that which acknowledges it now.

"She was more than an extremely capable administrator and woman of judgment and action. She was a sympathetic, loving friend, and no one knows this better than we of her department, who worked with her day after day, even when pain was racking her body, as was often the case even before her last illness.

"Her indomitable spirit was shown by the fact that after a period of three months in the hospital, where she received treatment for cancer which had metastasized to the spine, and then two months at home, she came to the office on March 1 for her fortieth anniversary with the Company. During the period of her hospitalization and until the last few days before her death, she directed much of the work of the department from her bed. That work which had filled a large part of her life for forty years was uppermost in her mind even in her closing days."

Through the years, many orthodontists in Europe, South America, Australia, and the Middle East have corresponded with her and reaped the benefits of her judgment, foresight, and knowledge of the publishing field. Because this dedicated woman, aided by her staff, for forty continuous years contributed much to the permanent recording of the written account of orthodontics as a specialty, and because of her impact on this record, the editors and readers of this JOURNAL proudly doff their hats to Marguerite Stadelhofer, who devoted her life to creating a lasting record of the health specialties.

H. C. P.

Editorial

SCIENCE AND ART

MOST authorities in the field of orthodontics have consistently referred to that field of endeavor as a science. To be sure, the basis of all branches of dentistry, as well as all other forms of the healing arts, is traceable to such an arrangement of ideas and ideals.

Webster defines *science* as systematized knowledge and *art* as knowledge made efficient by skill.

Certainly, the science of orthodontics has never wanted for expression. Great momentum has been given to it by waves of application of certain particular systems or ideas dealing with classifications and diagnosis.

Angle is to be credited with undoubtedly the original and practical clinical approach to diagnosis of malocclusions. Lischer further sciened the fundamentals of expression with respect to diagnosis of malocclusions, and gave great impetus to the means of diagnosis as first introduced in the United States by Simon in 1924. It was this man who first said, "The teeth are not studied and measured in relation to themselves but in relation to the head or the skull." One had merely to observe his works to realize that here was systematized knowledge.

With the passing of time, and with the advent of cephalometric radiography, one cannot but realize how important a milestone was implanted along our roadway by Dr. Simon. That the gnathostatic system of diagnosis has not been more popular in orthodontics may have been due to several reasons, but probably chiefly to its complicity. Perhaps the fact that there were scarcely any graduate schools in existence at the time led to its final limited use at the hands of a few, who today still make useful contributions to our literature.

With the popularity of cephalometric radiography, the adage of Simon—"The teeth are not studied and measured in relation to themselves but in relation to the head or the skull"—has taken on newer significance.

Critics of the gnathostatic system who are enthusiastic followers of cephalometry have been known to say that the reason they prefer the latter is that gnathostatic mechanics are too liable to failure. Men experienced in cephalometry have shown that therein also lies an error percentage. The most important difference between this newer device and the older methods is that it is more easily used.

In spite of the fact that perhaps never in the history of orthodontics has any one method of diagnosis been so sciened and approached in various ways by numerous workers as has cephalometrics, one fact must be remembered, namely, it is but one of several tools of diagnosis, the weight of any one of which may change an entire clinical approach.

It is to be greatly regretted that, as in the case of many other factors of influence, the cephalometric radiograph is sometimes used as a part of a scheme of promotion and is of absolutely no scientific value.

Delivering knowledge to the clinician has always been the goal of the researcher. Delivering the value of this knowledge to the patient requires the expending of the skill of the clinician, which constitutes the *art* of our profession as it does in the profession of the surgeon.

In the realm of medicine, the ramifications are so extensive that the clinician has more help than do we in orthodontics. We are peculiar in that we must both diagnose and treat and thereby solely in many instances exercise our knowledge of both the science and the art of our profession. We can never survive by exercising one of these tenets alone.

E. E. S.

Dr. Henry Hoffman Honored by Rocky Mountain Society of Orthodontists

THE Rocky Mountain Society of Orthodontists honored Henry Hoffman, one of its distinguished members, at a dinner in Santa Fe, New Mexico, on Sept. 30, 1956. The speakers paid tribute to Dr. Hoffman for his many contributions to dentistry and to orthodontics.

Dr. Hoffman's career dates from his graduation from the Colorado College of Dental Surgery in 1898, at about the time that orthodontics was first being talked about as a specialty of dentistry. He was one of the first general practitioners of dentistry in Denver, Colorado, to devote a part of his time to the nebulous practice of orthodontics. In 1913, at a time when there were few specialists in the United States, Dr. Hoffman restricted his practice to orthodontics.

Dr. Hoffman's record is indeed an interesting one. It is possible here to give only a brief summary of the career of this man whose achievements were *fully* revealed for the first time at the Santa Fe dinner.

As vice-president, president, and secretary, at various times, Dr. Hoffman has been a wheel horse in the Colorado State Dental Association for many years. He served as manager of the Colorado Springs postgraduate courses of 1920 and 1921. He was present with Dr. Fred McKay at the birth of the fluoride problem before the Colorado State Dental Association.

Dr. Hoffman has served on committees too numerous to mention, including that group which conducted what was known as the Colorado Painless Parker Campaign of 1927, which attracted attention all over America. He was one of the leaders in setting up the Colorado Dental Laws adopted by that state, and he served several times on the Colorado State Board of Dental Examiners.

He has been president, vice-president, and secretary of the Denver Dental Association. He served on the Public School Free Dental Clinic for many years following its organization in 1912.

For sixteen years Dr. Hoffman was a member of the Library Committee of the Denver Dental Association. During this period the Committee arranged for the care and operation of the dental library as a unit of the library of the Denver Medical Society, with mutual loan privileges for the members of both societies. For the Colorado State Dental Association, he was trustee for the liability insurance policy for 1923 to 1942, and was editor of the *Bulletin* in 1927, 1928, and 1929. He acted as chairman of the Publicity Committee of the Local Committee of Arrangements for the National Dental Association meeting in Denver in 1919, and was chairman of the same committee for the meeting of the American Dental Association in 1930. He was professor of orthodontics at the Colorado College of Dental Surgery for five years. He is a fellow of

HENRY HOFFMAN.

the American College of Dentists and is currently chairman of the Hospital Affairs Committee of the Denver Dental Association and of the Historical Research Committee of the Colorado State Dental Association. He was awarded the fifty-year "outstanding service award" for Colorado for the years 1900 to 1950 at Colorado Springs in October, 1950, by the Colorado State Dental Association.

His record in the Rocky Mountain area is too long and varied for his many activities to be outlined here. However, it is interesting and inspiring to review a few of the activities of his busy life. Not only is he presently a member of the American Association of Orthodontists, the Rocky Mountain Society of

Orthodontists, and a corresponding member of the Pacific Coast Society of Orthodontists, and certified by the American Board of Orthodontics, but he helped to organize the Rocky Mountain Society of Orthodontists and served as its president for three different years.

Dr. Hoffman was chairman of the Local Committee of Arrangements for the American Association of Orthodontists' 1929 meeting in Estes Park and chairman of the Orthodontic Section of the American Dental Association in St. Paul, Minnesota, in 1934. In addition to all his other activities, he has been associate editor of the AMERICAN JOURNAL OF ORTHODONTICS, representing the Rocky Mountain Society of Orthodontists, since 1941.

Dr. Hoffman was a member of a special committee to prepare a clinic demonstrating that certain types of malocclusion are crippling defects which should be included under the definition of crippled children and are a cause for eligibility for orthodontic care under the Colorado Department of Public Health. This effort was successful and a number of children have been treated, or are being treated, under this relief.

Dr. Hoffman is the author of about twenty articles which have been published in various dental journals and publications in the United States. His many contributions to the health services have not been confined to dentistry and orthodontics, but have applied to the broad field of public health.

Contributions in the Field of Public Health.—Dr. Hoffman was one of the incorporators of the Denver Public Health Council in 1925, and he has been a continuous member ever since, representing the Denver Dental Association. He was president of the Council from 1943 through 1947, and has acted as director from 1940 to the present time. He is presently member Emeritus of the Board of Directors of the Denver Public Health Council. He received the Florence R. Sabin Award on May 22, 1949, from the Colorado Public Health Association in "recognition and appreciation of outstanding service in the promotion and support of Public Health that has furthered and improved the health and well-being of the people of Colorado."

A resolution of appreciation to Dr. Hoffman was adopted by the Board of Directors of the Denver Public Health Council on Jan. 25, 1946. Space does not permit our listing in detail the many contributions by Dr. Hoffman that were outlined in the resolution. It is gratifying to note, however, that the resolution was officially spread upon the minutes of the Denver Public Health Council. It is also inspiring to note that here is another orthodontist who has launched out into another field and created a record of public service that is nothing short of amazing to read. We wonder how one man can accomplish so much in a half century and at the same time maintain a busy practice and enjoy his hobby of outdoor mountain exploring and recreation.

Dr. Hoffman is a man of extraordinary modesty and demeanor; his is the story of a pioneer orthodontist who avoided the spotlight. It is a story, however, that is an inspiration to the younger generations and is well worth recording for posterity. It reveals an honesty of purpose and integrity of character that are well worth emulating.

Dr. Hoffman is presently conducting an active orthodontic practice in the state university town of Boulder, Colorado, and it is presumed, without much fear of contradiction, that (including his years in general practice) he has probably chalked up more mileage in practice than any other living specialist today still in active practice. The Rocky Mountain Society, in honoring Dr. Hoffman at the thirty-sixth annual meeting, obviously were inferentially saying, "We doff our hats to a modest pioneer of the orthodontic specialty whose influence and contributions have been very great." The AMERICAN JOURNAL OF ORTHODONTICS joins the Rocky Mountain Society of Orthodontists in saluting one of orthodontics' unselfish and stalwart pioneers.

H. C. P.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Abstracts Presented Before the Research Section of the American Association of Orthodontists, Boston, May 1, 1956

The Anterior Pituitary-like Substance as an Adjunct in Orthodontics: By Jerome M. Sorrel, B.A., D.M.D., Columbia University, New York, New York.

In a study of the effects of the anterior pituitary gland on the human maxilla and mandible, we take into consideration the following known facts:

A. Anterior hypopituitary gland dysfunction inhibits proper growth of the maxilla and mandible.

B. Following the eruption of the sixth-year molars and the four incisor teeth, there is no further growth in length and circumference of the dental arch anterior to the first molar.

C. Prior investigations on animals having endocrine imbalance have shown that injections of the anterior pituitary-like substance causes an increase in the size of their jawbones.

If children, aged 7 to 11 years, in *normal* endocrine balance, were given anterior pituitary-like substance, would there be an increased growth of the arch of the maxilla and mandible? Such an increase in arch size has been noted by us in two children following ninety days of hormone therapy for unilateral cryptorchidism.

Angular Malrelations of the Cranial Base Associated With Malocclusion and Cleft Palate: By Melvin L. Moss, D.D.S., Ph.D., Columbia University, New York, New York.

A cross-sectional growth study of the postnatal human skull base is reported. In the neural skull, contour tracings of selected anatomic areas were derived from lateral roentgenograms. The areas selected allowed computation of the angular relationships between medial and lateral structures of the anterior cerebral fossa, and between the anterior and posterior fossae.

Selected areas of the facial skull were traced and their angular relationships to the neural skull were determined in normal, maloccluded, and cleft palate persons.

Normal growth of the human skull base is associated with changing angular relations between the medial and lateral portions of the anterior cerebral

fossa. These changes are associated with the growth of the orbits and the nose. The posterior fossa and the medial portion of the anterior fossa maintain a constant angular relation throughout life.

In malocclueded persons, only Class III (Angle) cases showed an alteration in angulation. This is described as an increased flexure of the base, a kyphosis. The malrelation is found between the medial portion of the anterior fossa (the planum sphenoidale) and the clivus (of the basioccipital). A similar, but more severe, kyphosis is found in all types of cleft palate.

Conformation of the Mandible: By Richard Ziegler, D.D.S., New York University, College of Dentistry, New York, New York.

The purpose of this investigation is to determine the quantitative relationship of ramus height, corpus length, and gonial angle in patients with malocclusion grouped according to the Angle classification. In this preliminary report Class III, Class II, Division 1, Class I, and those Class I cases which resemble Class III (abbreviated "Class I R 3") have been studied.

Ninety-six acceptable cephalometric roentgenograms were chosen from the files at the New York University Orthodontic Clinic. These roentgenograms were taken with the Bolton cephalometer, with approximately twenty-five in each category.

A line parallel to SN was drawn tangent to the left condyle of the mandible. From the point of tangency, a line was dropped to gonion. This gave us the ramus height. Corpus length is represented by the line from gonion to gnathion. The enclosed angle gave the gonial angle.

We found the mean of 52.07 mm. in Class I the largest and the mean of 50.8 in Class III and Class II, Division 1 the smallest in ramal height. The corpus length mean of 74.4 in Class III exceeded all the others. Among the Class III cases examined were included those with normal mandibles and shortened maxillae. When we exclude this latter type of Class III the differences are more startling.

The gonial angle mean ranged from 117.8 degrees for Class II, Division 1 to 125.86 degrees for Class III. Here also there was the minimizing effect of the normal mandible in the Class III cases associated with shortened maxillae.

Conclusion.—The smallest ratio of ramus height over corpus length was .68 for the Angle Class III cases. The mean of 125.86 degrees for the gonial angle of the Class III cases was the most obtuse of all the means of the classes studied. These findings confirm Hemley's description of the mandibular deformity found in Angle's Class III, namely, a relatively short ramus and relatively long body of the mandible with an obtuse gonial angle. The largest ratio of .72 was found in Class I.

In the Class I R 3, or "false Class III," the ratio .70 of ramus height over corpus length was next to the smallest. This contradicted Angle's idea that the condyle kept on growing backward to the glenoid fossa until a true Class III was attained.

A Study Showing How the Wetzel Grid Can Be Used as a Guide to Growth and Development in Orthodontic Therapy: By A. R. Lombardi, D.D.S., Columbia University, New York, New York.

The purpose of this investigation was to determine how the Wetzel grid could be integrated into the study of occlusion in mixed dentitions being conducted at the Columbia University Orthodontic Clinic.

A Wetzel grid record was initiated on thirty-six children in the mixed dentition stage of development, and a study was made of this phase of their growth pattern. Accurate recordings of height and weight appear on one

side of the Wetzel grid. On the reverse side appear annual notations, including a complete physical notation, together with a history of defects, diseases, accidents, or surgery occurring since the previous year and notations of previous findings which may have been corrected or resolved. In the case of a child with an involved medical history, height, weight, and progress notes may be made more frequently, at six-month or at three-month intervals.

It was found that the Wetzel grid record is simple, quick, and inexpensive, can be kept by the nurse or dental assistant, and is uniformly easy for the doctor to interpret. Despite its apparent simplicity, it gives the orthodontist a graphic picture of the patient's present growth pattern, by channeling the patient, and it predicts what his normal growth pattern should be. It is sensitive enough to act as a warning in event growth digresses from the patient's normal channel. It is far simpler and more thorough than any method now available for observing growth and development. It is of inestimable value in serial extraction cases where we depend greatly on the quality of growth of the patient. It can serve as a valuable aid in orthodontic therapy.

A Functional Radiographic Study of the Opening Movement of the Mandible in Children With Excellent Occlusion and With Malocclusion of the Teeth: By Frank H. Klepacki, D.D.S., Northwestern University Dental School, Chicago, Illinois.

The purpose of this study was to evaluate from a functional standpoint whether differences existed between two groups of persons with what are described as excellent occlusion and Class II, Division 1 malocclusion of the teeth. Ten persons were selected in each group. Both male and female subjects were used in the study. Using the Broadbent-Bolton cephalometer and the Donovan temporomandibular joint orienting device, two series of roentgenograms of the respective areas were obtained, with the mandible in the four following positions: occlusal position, physiologic rest position, partial open position, and maximum open position. No device was used to determine the amount of opening. It was found that the roentgenographic method used provided a practical means for the study of the opening movement.

Tracings were made from the two series of roentgenograms. The tracings were subjected to various linear and angular measurements, for which an arithmetic mean was determined. Furthermore, the tracings were arranged in a composite form, from which several observations were made. From the records obtained, it was found that from a functional standpoint there was a slight difference between the two groups described as excellent occlusion and Class II, Division 1 malocclusion of the teeth. These differences were not manifest as gross deviations, but rather were described as subtle tendencies. Although certain tendencies were exhibited by one group or another, much of the observations must be tempered by the statement that, within each group, subjects often manifested a fair degree of individual variation.

Facial Skeletal Changes Accompanying Orthodontic Treatment: By Henry J. Heim, Tufts University, Boston, Massachusetts.

The facial skeletal patterns of 100 orthodontic patients were studied to determine whether or not any significant changes had taken place during and after treatment.

Ninety sets of standardized sagittal roentgen cephalograms of treated patients were selected from the files of the Graduate Orthodontic Clinic at Tufts University School of Dental Medicine; ten were obtained from the

private practice of a member of the staff of the Orthodontic Department. The cephalograms taken after treatment represent conditions late in retention or following it. The Margolis cephalostat and fixator were used in this study.

To determine the degree of error in the method of assessment and in the apparatus used, an error study was first performed. Assessment of the facial pattern was accomplished by means of the maxillofacial triangle described by Margolis in 1947; thus, an over-all comparison of the facial pattern before and after treatment was obtained. Further facial skeletal changes were studied, using the Downs skeletal analysis. All angular measurements were evaluated statistically to determine any significant changes.

The patterns that existed before treatment were divided into two groups—favorable and unfavorable. This grouping was done in accordance with the conformity or lack of conformity with the means as demonstrated by Margolis. The patterns after treatment were examined to see if any unfavorable ones had changed to favorable and vice versa. Where significant changes were observed, they were correlated with treatment planning.

Development and Evaluation of a Radiopaque Indicator for Dental Units in Lateral Head Radiography: By Ted Lowell Harper, Jr., University of North Carolina, Chapel Hill, North Carolina.

There is a recognized need for a method improving the possibility of determining the position of certain teeth or parts of teeth in the lateral head roentgenogram. The literature reveals no satisfactory means whereby this may be accomplished.

Several methods were developed and tried. The most satisfactory method found was described and tested. This method consisted of a thin piece of lead foil with a suitable adhesive on one side.

When the satisfactory marking system is used in taking lateral head roentgenograms, a more precise and meaningful interpretation of the roentgenogram may be made.

The Intraoral Pressure Exerted on the Maxillary and Mandibular Central Incisors by the Tongue and Lips in Angle Class II, Division 1 Cases: By Huey M. Stevens, D.D.S., University of Tennessee, Memphis, Tennessee.

The object of this study was to establish, if possible, the range of force directed on the labial and lingual surfaces of the maxillary and mandibular central incisors in Angle Class II, Division 1 malocclusions.

Twenty-five subjects, regardless of sex, were chosen from the waiting list of patients in the Department of Orthodontics; there were sixteen female and nine male subjects. Casts and cephalometric roentgenograms were taken on each patient.

The apparatus used in this study to measure the pressure exerted on the teeth by the muscles of the tongue and lips is a converted electrocardiograph in which the galvanometer has been replaced with an optical manometer. In addition to this change, the battery-supplied light source was removed, and an alternating current transformer and bulb were put in its place. The original system of reflecting mirrors and condensing lenses was utilized.

The recording bulbs, measuring 13 mm. in length, 10 mm. in width, and 2 mm. in thickness, were made from self-curing liquid latex. To the bulb was attached a polyethylene tube.

At one sitting, five recordings of pressure were made on each of three areas: labial of the maxillary central incisors, labial of the mandibular central incisors, and on the lingual of the central incisors at the level of the plane of

occlusion. With the patient in an upright comfortable position in a chair, recordings were taken with the teeth closed together, then during swallowing, and last with their jaws in physiologic rest position.

From the data, the arithmetic mean, the standard deviation, the standard error, and the range were calculated. In an attempt to find some correlation between the lingual and labial muscular pressures, three scatter plots were made. In all three, the correlation coefficient was too small to demonstrate any significant relationship between the lingual and labial muscular pressures. In swallowing, however, the lingual pressure was found to exceed that of the labial in all persons tested.

The Relationship of the Positions of Incisor Teeth to Their Supporting Structures in Superior Occlusion Cases as Revealed by Planimetry: By Robert M. Williams, D.D.S., University of Tennessee, Memphis, Tennessee.

An investigation was conducted on twenty-four male subjects with superior to excellent occlusion. The mean age was 24.1 years, with a range of 19 to 35 years. The lower central incisor was related to the cross section of the symphysis (supporting and basal bone) by recording the angular relationship of the long axis of the incisor to the constructed long axis of the cross section of the symphysis as seen on a lateral headfilm. The construction of the long axis of the supporting and basal bone (cross section of symphysis) is new and may be constructed uniformly in each case.

The area of the bone to the lingual of the long axis of the lower central incisor and the area of the bone to the labial of the long axis of the lower central incisor as seen on the lateral headfilm was measured. The measurement of the areas was accomplished by using a K & E compensating polar planimeter No. 4236M with a measuring accuracy of 0.1 sq. cm. The labial area divided by the lingual area gave us a ratio which was correlated to various other measurements. Areas similar to those in the mandible were measured in the maxilla and ratios of labial area to lingual area were determined.

The mandibular area ratio was correlated to the angle of the lower central incisor to the basal bone, cotangent of the angle of closure, tangent of the angle that the upper incisor made with the lower incisor, and the angle that the lower incisor made with the mandibular plane.

The maxillary area ratio was correlated to the angle that the upper incisor made with the palatal plane, cotangent of the angle of closure, and tangent of the angle that the upper incisor made with lower incisor.

The mandibular area was then limited to that area superior to a line drawn perpendicular to the long axis of the incisor 5 mm. below the apex of the tooth. The ratio of areas was determined as before. This ratio of the limited area was correlated with the angle that the lower incisor made with the basal bone.

Two of the above correlations resulted in fairly high coefficients of correlation. The mandibular ratio of areas correlated to the angle of 1 to basal bone with a correlation coefficient of 0.650. When the area was limited as described and the ratio correlated to the angle of 1 to basal bone, a coefficient of 0.688 correlation was obtained. Other correlations involving the areas were not high enough to show a tendency. A "t" test was conducted on the correlation coefficients and they were found to differ significantly from zero, the probability being less than one chance in 1,000, with 23 degrees of freedom.

(Additional abstracts presented before the Research Section of the American Association of Orthodontists in May, 1956, will appear from time to time in forthcoming issues of the Journal.)

News and Notes

American Association of Orthodontists 1957 Annual Meeting

Cabildo, New Orleans

The historic landmark shown in the accompanying photograph was constructed in 1795 and originally housed the Very Illustrious Cabildo, the Spanish governing body of that day. From it, Spain's governors ruled not only New Orleans but the entire Mississippi Valley west to the great river. The typically French third story was added later.

The Cabildo, New Orleans.

Beneath the building's roof was enacted the final scene of the world's greatest real estate transaction—the Louisiana Purchase.

The Cabildo, now a museum, is in the old part of the city, just a few blocks away from the Roosevelt Hotel, headquarters of the American Association of Orthodontists, which will meet in New Orleans, May 12 to 16, 1957.

1957 Prize Essay Contest, American Association of Orthodontists

Eligibility.—Any member of the American Association of Orthodontists and any person affiliated with a recognized institution in the field of dentistry or associated with it as a teacher, researcher, undergraduate, or graduate student shall be eligible to enter the competition.

Character of Essay.—Each essay submitted must represent an original investigation and contain some new significant material of value to the art and science of orthodontics.

Prize.—A cash prize of $500.00 is offered for the essay judged to be the winner. The committee, however, reserves the right to omit the award if, in its judgment, none of the entries is considered to be worthy. Honorable mention will be awarded to those authors taking second and third places. The first three papers will become the property of the American Association of Orthodontists and will be published. All other essays will be returned.

Specifications.—All essays must be in English, typewritten on 8½ by 11 inch white paper, double spaced with at least 1 inch margins. Each sheet must be numbered and bound or assembled with paper fasteners in a "brief cover" for easy handling. The title of the essay should appear on the "brief cover." Three complete copies of each essay, including all illustrations, tables, and bibliography, must be submitted. The name and address of the author must not appear in the essay. For purpose of identification, the title of the essay, the author's name, together with a brief biographical sketch which sets forth his or her dental and/or orthodontic training, present activity, and status (practitioner, teacher, student, research worker, etc.) should be typed on a separate sheet of paper and enclosed in a plain sealed envelope. The envelope should carry the title of the essay.

Presentation.—The author of the winning essay will be invited to present it at the meeting of the American Association of Orthodontists to be held in New Orleans, Louisiana, May 13 through 16, 1957.

Judges.—The entries will be judged by the Research Committee of the American Association of Orthodontists.

Final Submission Date.—No essay will be considered for this competition unless received in triplicate on or before Jan. 10, 1957, by Dr. J. William Adams, Indiana University, School of Dentistry, Indianapolis, Indiana.

Alton W. Moore, Chairman, Research Committee
American Association of Orthodontists
University of Washington
School of Dentistry
Seattle 5, Washington

American Association of Orthodontists, 1957 Research Section Meeting

Continuing the policy of recent years, the program will consist of a series of ten-minute research reports which may be presented orally or read by title only. All persons engaged in research are urged to participate in this program, which will be held May 13 through 16, 1957, in New Orleans, Louisiana.

Each participant is asked to prepare a 250-word abstract for publication in the AMERICAN JOURNAL OF ORTHODONTICS. Abstract for publication and the ten-minute oral presentation at the meeting should be carefully prepared to present an adequate description of the import of your investigation.

Forms for use in submitting the title and 250-word abstract of your research will be sent to each dental school orthodontic department and to any individual requesting one. Please send your title and abstract as early as possible, but not later than Jan. 10, 1957, to Dr. William B. Downs, Graham Building, Aurora, Illinois.

Alton W. Moore, Chairman, Research Committee
American Association of Orthodontists
University of Washington
School of Dentistry
Seattle 5, Washington

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Roosevelt Hotel in New Orleans, Louisiana, May 7 through 11, 1957. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. Wendell L. Wylie, University of California, School of Dentistry, San Francisco 22, California.

Applications for acceptance at the New Orleans meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1957. To be eligible, an applicant must have been an active member of the American Association of Orthodontists for at least two years.

Central Section of the American Association of Orthodontists

The nineteenth annual meeting of the Central Section of the American Association of Orthodontists was held at the Edgewater Beach Hotel in Chicago, Illinois, Sept. 30 through Oct. 2, 1956. The program follows.

Sunday, September 30

Informal get-together from 5 to 7 P.M., with the Chicago Association of Orthodontists serving as hosts.

Monday, October 1

Registration.

Invocation. The Reverend Benjamin Wills, Rector of Country Church in Chicago.

Address of Welcome. Richard A. Smith, Evanston, Illinois, president. (After this, Dr. Smith introduced Waldo Urban, chairman of the Essay Program Committee.)

Present Orthodontic Thought in Germany. Gustav Korkhaus, Bonn, Germany.

Case Report. Karl von der Heydt, Glen Ellyn, Illinois.

The Factor of Stabilization in Anchorage. Earl W. Renfroe, Chicago, Illinois.

Luncheon and business meeting in the South Terrace Room.

Arch Width in the Bicuspid Region—Still the Major Problem in Orthodontics. Ashley Howes, New Rochelle, New York.

Case Report. Earl E. Shepard, St. Louis, Missouri.

Form and Function in Orthodontics. John R. Thompson, Chicago, Illinois.

Case Report. Frank Ryan.

An innovation at the meeting was the omission of a regular routine banquet. Most members were pleased, inasmuch as they formed groups and had a "night on the town" at places of their own choosing.

Tuesday, October 2

Some Uses and Abuses of Norms in Case Analysis and Treatment Planning. E. H. Hixon, Iowa City, Iowa.

Case Report. Frank C. Jefferies, Des Moines, Iowa.
Morphology of Facial Patterns. William B. Downs, Aurora, Illinois.
Case Report. Ben L. Herzberg, Chicago, Illinois.
Luncheon and business meeting in the South Terrace Room.

Table Clinics:

1. Utilization of All Available Anchorage in Class II Treatment. H. N. Delbridge, Beloit, Wisconsin.
2. Open-Bite. J. E. Berger, Bismarck, North Dakota.
3. Space Obtainer. W. E. Stoft, Omaha, Nebraska.
4. The Geometry and Mechanics of Eccentric Cervical Traction. Graduate Orthodontic Department, University of Nebraska.
5. Open-Bite Cases. W. E. Gerber, Chicago, Illinois.
6. A Unilateral Attachment for Class II Elastic. W. M. Jacobsen, Minneapolis, Minn.
7. Extraction in Cleft Palate Cases. G. L. Englert, Danville, Illinois.
8. Examples of Minimal Appliance Therapy. D. H. Ketterhagen, Milwaukee, Wisconsin.
9. Cleft Palate and the Orthodontists. S. M. Rosenstein, M. E. Franks, F. A. Klepacki, Northwestern University Cleft Lip and Palate Institute, Chicago, Illinois.
10. Space Closing Retainer With Coil Springs. W. N. Epstein, University City, Missouri.
11. Extraction of Lower Bicuspids in Class III. J. S. Gold, Highland Park, Illinois.
12. Reaction of Vital and Devitalized Teeth. R. W. Young, Des Moines, Iowa.
13. Records at a Glance. F. C. Jefferies, Des Moines, Iowa.
14. Anchorage. Graduate Orthodontic Department, University of Illinois, E. W. Renfroe, Chicago, Illinois.
15. Headcap Progression. M. M. Meilach, Chicago, Illinois.
16. Retention. H. M. Stackler, Chicago, Illinois.
17. Problems in Retention. F. J. Hanagan, Chicago, Illinois.
18. The Dento-Facial Complex in Twins, Siblings, and Parents. M. L. Braun, Park Forest, Illinois.

The following officers for 1956-57 were installed:

President: Thomas D. Speidel, Minneapolis, Minnesota.
President-Elect: Fredrick B. Lehman, Cedar Rapids, Iowa.
Vice-President: John R. Thompson, Chicago, Illinois.
Representative to the Board of Directors of the American Association of Orthodontists: P. M. Dunn, Minneapolis, Minnesota.
Alternate: Elmer F. Bay, Omaha, Nebraska.
Sectional Editor, American Journal of Orthodontics: Charles R. Baker, Evanston, Illinois.
New Member of the Board of Censors: Harland L. New, Park Ridge, Illinois.
New Member of the Publication Board (Re-elected): Donald H. Ketterhagen, Milwaukee, Wisconsin.
New Member of the Judicial Board: John E. McDermott, Ottumwa, Iowa.

Great Lakes Society of Orthodontists

The Great Lakes Society of Orthodontists held its twenty-seventh annual meeting at Ottawa, Canada, Oct. 7 through 10, 1956. The program follows.

October 7

Sunday evening get-together at the Chateau Laurier.

October 8

Monday morning:

Complimentary Continental Breakfast for all members. (Monday, October 8, was the Canadian Thanksgiving.)

President's Address. Milton R. Culbert, Toronto, Canada. (This address, which carried a message of great importance to all members of the dental profession, occupied a full column on the first page of a Toronto newspaper.)

Routine Use of Minute Forces. Holly Halderson, Toronto, Canada.

What the Dentist Should Know About Investing. Louis H. Whitehead, New York, N. Y.

Society Luncheon for members and wives. The luncheon featured an address by the Honorable Paul Martin, Minister of National Health and Welfare, Canada's delegate to the United Nations, who spoke on "Some Aspects of Canadian Foreign Policy."

Monday afternoon:

Conducted tour through the Parliament buildings, followed by a bus trip through the capital city of Canada.

Monday evening:

President's Reception and Banquet, followed by entertainment and dancing.

October 9

Tuesday morning:

Retarded Development of the Middle Facial Skeleton and Upper Jaw. Gustav Korkhaus, Bonn, Germany.

Influence of Occlusal Stress on Periodontal Tissues. William G. McIntosh.

Your Personal Investment Program and Estate Plan. Louis H. Whitehead, New York, N. Y.

Ethics of Transfer Case. Scott T. Holmes, Muskegon, Mich.

Extraoral Force Therapy. James Jay, New York, N. Y.

Surgical Procedures Associated With Orthodontic Therapy. James P. Coupland.

Tuesday evening:

Table Clinics.

October 10

Wednesday morning:

Experiences With the Norwegian Method of Functional Orthopedia in the Treatment of Distoclusion. Gustav Korkhaus, Bonn, Germany.

Thumb and Finger Sucking. T. M. Graber, Chicago, Ill.

Early Treatment. Richard E. Barnes, Cleveland, Ohio.

The following new officers were installed:

President: Harlow L. Shehan
Vice-President: Richard C. Beatty
President-Elect: Edwin C. Flint
Secretary: D. C. Miller
Treasurer: Russell E. Huber
Directors to the American Association of Orthodontists: Robert E. Wade and Harlow L. Shehan
Program Chairman: Hunter I. Miller.

The 1957 annual meeting will be held in Detroit, Michigan.

Middle Atlantic Society of Orthodontists

The Middle Atlantic Society of Orthodontists met at Haddon Hall, Atlantic City, New Jersey, on Oct. 14, 15, and 16, 1956. Local Arrangements Chairman Charlie Jones and his committee provided excellent facilities. Chairman George Anderson produced an exceptional scientific program with a "flow" of thought from cephalometric analysis through clinical analysis and translation into treatment.

The following papers were presented:

Basic Cephalometric Analysis. T. M. Graber, Chicago, Illinois.

Cephalometric Equipment and Technical Details for the Office. T. M. Graber, Chicago, Illinois.

The Importance of an Adequate Clinical Case Analysis in Orthodontic Treatment. B. F. Dewel, Evanston, Illinois.

Individual Diagnosis and Case Analysis Translated Into Treatment. Harlow L. Shehan, Jackson, Michigan.

There was also a panel discussion, with the three essayists answering questions.

Included in the entertainment portion of the meeting was a Sunday evening get-together party subsidized by the members from Maryland and the District of Columbia. Luncheon on Monday featured an inspiring talk by the Most Reverend Lawrence J. Shehan, Bishop of Bridgeport, Connecticut, who is President Daniel E. Shehan's brother. Monday night featured a reception and buffet supper in honor of President and Mrs. Shehan. Tuesday's luncheon included the formal induction of new active and associate members. As usual, the ladies attending enjoyed Boardwalk tours in the balmy October seaside atmosphere.

Registration at the meeting was 163. The Society now numbers 115 active, 9 associate, 13 affiliate, 1 retired, and 1 honorary members.

Annual elections resulted in the following roster of officers:

President: Aubrey P. Sager
President-Elect: Gerard A. Devlin
Vice-President and Editor: Stephen C. Hopkins, Sr.
Secretary-Treasurer: Paul A. Deems
Director: George M. Anderson
Alternate Director: Kyrle W. Preis

Rocky Mountain Society of Orthodontists

The annual meeting of the Rocky Mountain Society of Orthodontists was held at Bishop's Lodge in Santa Fe, New Mexico, Oct. 1 and 2, 1956. The two main clinicians were J. William Adams, Chairman of the Department of Orthodontics at Indiana University, and Samuel Pruzansky, Consultant to the Cleft Palate Center at the University of Illinois. Dr. Oliver La Farge, author and cultural anthropologist from Santa Fe, spoke on the historic background of the Santa Fe area.

On Monday evening, October 1, a dinner was held honoring Henry F. Hoffman for his contributions in dentistry and orthodontics. Dr. Oliver H. Devitt, on behalf of the Society, presented Dr. Hoffman with an engraved sterling silver buckle and belt. Dr. Hoffman was also presented with an honorary membership in the Rocky Mountain Society, retaining the right to vote and hold office.

Newly elected officers for the coming year are:

President: J. Lyndon Carman
President-Elect: George E. Ewan
Vice-President: Howard Wilson
Secretary-Treasurer: H. Carlyle Pollock, Jr.

Southern Society of Orthodontists

The thirty-fifth annual meeting of the Southern Society of Orthodontists was held at the Greenbrier Hotel, White Sulphur Springs, West Virginia, Aug. 19 to 22, 1956.

Out of a membership of 177 active, 23 associate, 7 honorary, and 1 retired members, there were in attendance 127 members and associates, 23 members of other sectional societies, 9 nonmembers, and 14 exhibitors. Members, wives, children, and guests made a total registration of 292.

Among the guests at the meeting were Dr. A. C. Broussard of New Orleans, Louisiana, President of the American Association of Orthodontists; Dr. W. B. Stephenson of Amarillo, Texas, vice-president of the American Association of Orthodontists; Dr. Daniel Shehan of Baltimore, Maryland, president of the Middle Atlantic Society of Orthodontists; Dr. Philip

E. Adams of Boston, Massachusetts, immediate past-president of the American Association of Orthodontists; and "Uncle Jake" Gorman of New Orleans, Louisiana, one of the first practicing orthodontists in the South, who, although retired, never misses a meeting.

The following were elected to active membership in the Society:

Karel I. Andreve, Greensboro, North Carolina
William P. G. Dodson, Arlington, Virginia
S. D. Gore, Jr., New Orleans, Louisiana
James B. McCabe, Birmingham, Alabama
Joseph S. Meadows, Atlanta, Georgia
William M. Selden, Louisville, Kentucky
Robert F. Taylor, Memphis, Tennessee
Clyde O. Wells, Jr., Spartanburg, South Carolina

The following men were elected to active membership direct:

Jerold F. Ahlfs, Fort Lauderdale, Florida
Hernando de Castro, Miami, Florida
Marion F. Dick, Birmingham, Alabama
Kenneth K. Shephard, West Palm Beach, Florida

Out of twenty-one applications for associate membership, the following were elected:

Toof A. Boone, Macon, Georgia
Willis R. Brown, Mobile, Alabama
Edward H. Hamilton, Knoxville, Tennessee
Ralph E. Karan, Alexandria, Virginia
William G. Martin, Roanoke, Virginia
Donald Morrison, Jr., Gainesville, Florida
James E. Paulk, Sarasota, Florida
James E. Phipps, Huntington, West Virginia
D. Frank Rentz, Coral Gables, Florida
John J. Richardson, Florence, South Carolina
John Russell, Columbus, Mississippi
John F. Schwartzbak, St. Petersburg, Florida
Theodore Segal, Louisville, Kentucky
Richard Starr, Coral Gables, Florida
Jacob F. Straight, Coral Gables, Florida
Horace D. Wilder, Louisville, Kentucky
Neal Roth, Jacksonville, Florida

The program follows:

Saturday, August 18

Reception honoring officers, new members, and their wives.

Sunday, August 19

Informal cocktail party from 6:30 to 8 P.M.

Monday, August 20

The Edgewise Arch Appliance in Theory and Practice. F. Copeland Shelden, Kansas City, Missouri.

A Different Approach to Extraction. Paul V. Reid, Philadelphia, Pennsylvania.

The Rise of Mechanics in the Extraction Case. F. Copeland Shelden, Kansas City, Missouri.

Individual Case Analysis Involving Atypical Extractions. Paul R. Reid, Philadelphia, Pennsylvania.

Informal cocktail party on Auditorium Terrace from 6:30 to 8 P.M.

Tuesday, August 21

A Treatment Technique for Extraction Cases Using Some Modifications of the Johnson Twin Arch Wire. Faustin N. Weber, Memphis, Tennessee.

Luncheon in Mural Dining Room honoring Dr. A. G. Broussard, president of the American Association of Orthodontists; new members; and Dr. Clinton C. Howard (1884-1955), first president of the Southern Society.

The Clinical Application of the Modified Johnson Twin Arch Wire Technique. Faustin N. Weber, Memphis, Tennessee.

Reception in main ballroom honoring President and Mrs. William M. Jarrett and other officers.

Wednesday, August 22

Fifteen Table Clinics (thirteen by members and two by guests).

Business session at which attendance prizes were given, golf trophies were awarded, and the following officers were installed:

President: Frank P. Bowyer, Knoxville, Tennessee
President-Elect: John A. Atkinson, Louisville, Kentucky
Vice-President: William Weichselbaum, Savannah, Georgia
Secretary-Treasurer: H. K. Terry, Miami, Florida
Assistant Secretary: Henry Harrelson, Charlotte, North Carolina

Charles Harrison was elected Junior Director of the Board of Directors.

Committee appointments were: *Necrology,* Hubert Gosney; *Education,* Prescott Smith; *Research,* Tyler Haynes; *Public Relations,* James Brousseau; *and Constitution and By-Laws,* Charles Smith.

The Southern Society is looking forward to another fine meeting next year at the Eden Roc Hotel, Miami, Florida, October 27-30, the week prior to the meeting of the American Dental Association. An outstanding program is being planned and it is the hope of Dr. Frank Bowyer, president, that the location and time of the meeting will attract not only our own membership, but also many visitors from other sectional societies.

Oren A. Oliver

Pacific Coast Dental Conference

The tenth triennial Pacific Coast Dental Conference, to be held in San Diego, California, next August 19 to 22, will combine an outstanding scientific program with vacation attractions.

The Southern California State Dental Association, which is hosting the 1957 conference, promises some of the nation's foremost clinicians from all geographic sections of the country. Scientific sessions will be held on the four mornings of the conference. The afternoons will offer planned events for the dentists and their families to enjoy.

On tap for afternoon entertainment will be trips to the San Diego Zoo, world renowned for its exhibits of animals in their natural habitat; Tijuana, colorful Mexican city which saw more tourists cross the border last year than any other border port of entry into the United States; boat excursions of San Diego Bay, named by thousands of travelers as one of the world's great marine views; a variety of aquatic sports, ranging from fishing in the famed Yellowtail Derby to water skiing; a ride in the glass elevator of the El Cortez Hotel which affords one of the world's breath-taking views of city and harbor.

The conference is open to all members of the American Dental Association and component societies, as well as our neighbors in Mexico and Canada. Inquiries and requests for reservations may be addressed to Dr. C. W. Gilman, Secretary, 219 East 8th St., National City, California.

Spencer Roane Atkinson Honored at Testimonial Dinner

Dr. Spencer Roane Atkinson, nationally known orthodontist and retiring head of the Graduate Orthodontic Department of the School of Dentistry, University of Southern California, was honored by faculty, students, and members of the profession at a testimonial dinner held on October 12 at the University Club in Los Angeles.

Over 300 colleagues attended the event, to which orthodontists representing Europe, the Far East, and Pan American countries were invited.

In retiring, Dr. Atkinson concluded thirty-nine years of practice and teaching during which he has achieved an international reputation in his field. He received the Ketcham Award in 1953 from the American Association of Orthodontists for having contributed most of value during that year. He also holds numerous awards from Mexico for his frequent visits to that country over the past twenty years, one of the most important of these being the Double Aztec Eagle, highest honor given by the government.

He has also served as visiting professor at the University of Yucatan, and was honorary president of the Medico-Dental Conference in 1938. He was made a perpetual president of the Mexican Orthodontic Association, and a wing in the new School of Dentistry of the University of Guadalajara is named for him. While he has confined the majority of his practice to children and is a pioneer in that field, his interests are many. As an anthropologist he has one of the finest collection of skulls in the world, and his professional ability as a photographer of scientific work has brought him renown.

SPENCER ROANE ATKINSON.

Dr. Atkinson first attended the Georgia School of Technology in 1903-05, earned his D.D.S. from Southern Dental College in 1917, took special studies at the Angle College of Orthodontics in Pasadena in 1920, and received the honorary Master of Dental Science degree from the University of Southern California in 1936. He has practiced orthodontics since 1917. He taught at Emory University from 1917 to 1924. He came to Southern California in 1936, and served as director of graduate orthodontics from that time until his retirement.

With Dean Robert McNulty acting as toastmaster, a group of speakers were introduced. Representing former students of the graduate school were: Dr. George C. Chuck of Long Beach and Dr. Robert J. Gawley of Alhambra. Dean John Tocchini of the College of Physicians and Surgeons in San Francisco, where the guest of honor has been visiting professor of orthodontics for a number of years, brought the greetings of that institution. This was followed by an address of Dr. Albert S. Raubenheimer, educational vice-president of the University of Southern California, who told of Dr. Atkinson's efforts in the broad

field of education. His remarks were followed by those of Dr. James D. McCoy, a past-president of the American Association of Orthodontists, who brought the felicitations of that organization. Dr. Fred D. Fagg, Jr., president of the University of Southern California, supplemented the remarks made by Dr. Raubenheimer and then Dr. Rufus B. von Kleinsmid, chancellor of the University added his words of commendation. Dr. George M. Hollenback then presented a bas relief which had been made of Dr. Atkinson and will be hung at a suitable location in the School of Dentistry.

Dean McNulty then introduced the guest of honor, who received a standing ovation and addressed the assemblage in an appropriate and pleasing manner.

W. R. Alstadt, President-Elect of the American Dental Association

Dr. W. R. Alstadt, 40-year-old orthodontist, of Little Rock, Arkansas, has become the first dentist from Arkansas ever to be named president-elect of the American Dental Association. He also is the youngest man named to this office in the ninety-seven-year history of the A. D. A.

W. R. ALSTADT.

Dr. Alstadt has led a very busy life in constructive work for organized dentistry; in addition to that he has been very active in civic affairs in his home state. He has served as a member of the American Dental Association's Board of Trustees, representing the seven southwestern states of Arkansas, Colorado, Kansas, Louisiana, New Mexico, Oklahoma, and Texas. In addition, he is a diplomate of the American Board of Orthodon-

tics, a fellow of the American College of Dentists, a fellow of the International College of Dentists, and a member of the Federation Dentaire Internationale, American Association for the Advancement of Science, American Society of Dentistry for Children, and other scientific groups.

University of Alabama

The University of Alabama School of Dentistry announces that a refresher course in removable orthodontic appliance construction will be given Feb. 23 through 25, 1957, by Dr. Samuel D. Gore. The course is limited to persons currently practicing orthodontics.

Twelfth International Dental Congress

The Twelfth International Dental Congress will be held in Rome, Italy, Sept. 7 to 14, 1957. The preliminary program of the scientific sessions reveals that the following orthodontic papers are to be presented:

Monday, September 9

DENTO-MAXILLO-FACIAL ORTHOPEDICS: AETIOLOGY AND PREVENTION.
Rep.: Dr. J. A. Salzmann, Editor of the *New York Dental Journal.*
Chairman: Prof. B. De Vecchis.

DENTO-MAXILLO-FACIAL ORTHOPEDICS: DIAGNOSTICS.
Rep.: Prof. Dr. Gustav Korkhaus, Director of the Dental Institute and Clinic of the University of Bonn, Germany.
Chairman: Prof. Oscar Hoffer.

Tuesday, September 10

DENTO-MAXILLO-FACIAL ORTHOPEDICS: THERAPY.
Rep.: Prof. Dr. Selmer-Olsen, Norwegian School of Dentistry, Oslo, Norway.
Dr. Kaare Reitan, 8 Radhusgatan, Oslo, Norway.
Chairman: Prof. Giuseppe Maccaferri.

Organization of the Congress

Official Languages.—The official languages of the Congress are English, French, German, Italian, and Spanish. Other languages may be used with the consent of the presiding officer of each meeting.

Simultaneous Translation.—Simultaneous translation in the five official languages will be available at all meetings during the Congress.

Program of the Congress.—The Congress will hold (1) general meetings; (2) meetings of each scientific section; (3) clinical and technical demonstrations; (4) surgical mouth operations, anesthesia, plastic and maxillofacial surgery in the various dental clinics, dental institutes, and hospitals of Rome; (5) sessions of projection of scientific films; and (6) sessions of television (on large screen).

Dr. Pio Lalli, Via Boezio, 16, Rome, Italy, is secretary-general of the Congress.

James M. Epperly Named New Chief of Army Dental Corps

Brigadier General James M. Epperly of Huntsville, Missouri, presently Director of Dental Activities at the Brooke Army Medical Center, Fort Sam Houston, Texas, has been named, with the approval of the President of the United States, Assistant Surgeon General of the Army and Chief of the Army Dental Corps.

General Epperly will succeed Major General Oscar P. Snyder who retires on November 30 after serving since April 12, 1954, in that capacity. General Epperly's promotion to major general is expected to be made at the time he takes the oath of office as the new head of the Army's dental officers.

He was born July 5, 1900, at Duncans Bridge, Missouri, and was graduated from St. Louis University with the degree of doctor of dentistry in 1923. During his college days he took ROTC training, and eight months after graduation he was commissioned a first lieutenant. His first military dental assignment was as an intern at Fitzsimons Army Hospital in 1924.

Following the completion of this training, in the next year he was admitted as a student at the Army Dental School, at the Army Medical Center in Washington, D. C., for a four-month course and subsequently matriculated at the Medical Field Service School, Carlisle Barracks, Pennsylvania.

In July, 1925, he became a first lieutenant in the Regular Army and in 1926 he went to the Philippines, where he remained for two years. Upon his return to the United States he was stationed at the Presidio in San Francisco until 1932 and then at the Letterman Army Hospital in the same city. In 1935 he was ordered to Panama; this assignment was followed by tours of duty in Washington, D. C., and at the United States Military Academy at West Point.

One of General Epperly's most important mid-career assignments was to establish a dental service at the newly opened Camp Breckenridge in Kentucky, and to administer that service as chief. This was in July, 1942, and he attained the rank of colonel while on this assignment.

As the war period deepened, General Epperly was named to the headquarters personnel of the Ninth Army and moved with it to Europe, going from England to France at the close of hostilities and eventually to Germany.

In 1946 he was appointed Chief, Dental Service Branch in the Office of The Surgeon General of the Army, remaining until he was transferred in 1951 to Fitzsimons Army Hospital. In May, 1953, during temporary duty in Greece to study the dental service of the Greek Army and make recommendations concerning this service, he was promoted to the rank of brigadier general. In April of the next year he was assigned to Brooke Army Medical Center as Director of Dental Activities, where he replaced General Snyder, who was at that time called to Washington to become the Chief of the Army Dental Corps.

General Epperly was married during his early San Francisco duty, and Mrs. Epperly will accompany him to Washington for his new tour. They have no children.

Temple University School of Dentistry

Temple University School of Dentistry announces the presentation of a two-week postgraduate course in periodontics by Dr. Jacoby Rothner and staff, March 4 to 16, 1956. There will be a fee of $200.00; enrollment will be limited to twelve.

For application and information, apply to Dr. Louis Herman, Director of Postgraduate Studies, Temple University School of Dentistry, 3223 North Broad St., Philadelphia 40, Pennsylvania.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists will be held March 4 and 5, 1957, at the Hotel Commodore, New York, New York.

Notes of Interest

Alfred Jaffe, D.D.S., announces the removal of his office to 370 Ives St., Providence, Rhode Island, practice limited to orthodontics.

Homer Anson Potter, D.D.S., announces the association of D. W. McKinnon, D.D.S., in the practice of orthodontics at 2024 Swift, North Kansas City, Missouri.

OFFICERS OF ORTHODONTIC SOCIETIES

THE AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

American Association of Orthodontists

President, A. C. Broussard - - - - - - - - - Maison Blanche Bldg., New Orleans, La.
President-Elect, Franklin A. Squires - - - - - - - Medical Centre, White Plains, N. Y.
Vice-President, William B. Stevenson - - - - - - - - 610 West 8th St., Amarillo, Texas.
Secretary-Treasurer, Earl E. Shepard - - - - - - - - - 8230 Forsyth, St. Louis, Mo.

Central Section of the American Association of Orthodontists

President, Thomas D. Spiedel - - - - - - University of Minnesota School of Dentistry, Minneapolis, Minn.
Secretary-Treasurer, William F. Ford - - - - - - - 575 Lincoln Ave., Winnetka, Ill.

Great Lakes Society of Orthodontists

President, Harlow L. Shehan - - - - - - 601 Jackson City Bank Bldg., Jackson, Mich.
Treasurer, Russell E. Huber - - - - - - - - 350 Fidelity Medical Bldg., Dayton, Ohio
Secretary, D. C. Miller - - - - - - - - - - - - 30 South Third St., Columbus, Ohio

Middle Atlantic Society of Orthodontists

President, Aubrey P. Sager - - - - - - - 1211 Medical Arts Bldg., Philadelphia, Pa.
Secretary-Treasurer, Paul Deems - - - - - - - - - 835 Park Ave., Baltimore, Md.

Northeastern Society of Orthodontists

President, Oscar Jacobson - - - - - - - - - - - 35 W. 81st St., New York, N. Y.
Secretary-Treasurer, Wilbur J. Prezzano - - - - - Medical Centre, White Plains, N. Y.

Pacific Coast Society of Orthodontists

President, A. Frank Heimlich - - - - - - - 1824 State St., Santa Barbara, Calif.
Secretary-Treasurer, Raymond M. Curtner - - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, J. Lyndon Carman - - - - - - - - - - 501 Republic Bldg., Denver, Colo.
Secretary-Treasurer, H. Carlyle Pollock, Jr. - - - - - 1558 Humboldt St., Denver, Colo.

Southern Society of Orthodontists

President, Frank P. Bowyer - - - - - - - - 608 Medical Arts Bldg., Knoxville, Tenn.
Secretary-Treasurer, H. K. Terry - - - - - - - - 2742 Biscayne Blvd., Miami, Fla.

Southwestern Society of Orthodontists

President, Ott L. Voigt - - - - - - - - - - - - 4115 Fannin, Houston, Texas.
Secretary-Treasurer, Harold S. Born - - - - - - - 908 S. Johnstone, Bartlesville, Okla.

American Board of Orthodontics

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Vice-President, Lowrie J. Porter - - - - - - - 41 East 57th St., New York, N. Y.
Secretary, Wendell L. Wylie - - - - - University of California School of Dentistry, The Medical Center, San Francisco, Calif.
Treasurer, Jacob A. Salzmann - - - - - - - - 654 Madison Ave., New York, N. Y.
Director, William R. Humphrey - - - - - - - - - - Republic Bldg., Denver, Colo.
Director, L. Bodine Higley - - - - University of North Carolina, Chapel Hill, N. C.
Director, B. F. Dewel - - - - - - - - - - - - - - 708 Church St., Evanston, Ill.

Forthcoming meetings of the American Association of Orthodontists:
1957—Roosevelt Hotel, New Orleans, Louisiana, May 12 to 16.
1958—Commodore Hotel, New York, New York, April 27 to May 1.
1959—Statler Hotel, Detroit, Michigan, May 4 to 7.

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Its Component Societies, and
the American Board of Orthodontics

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ADERER NO. 1 WIRE	110,000 Q 173,500 OC	60,000 110,000	1762	19 5.5	.0069	30	5 2.5
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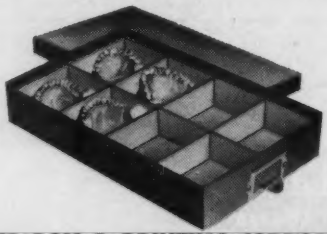

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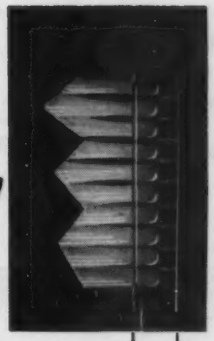

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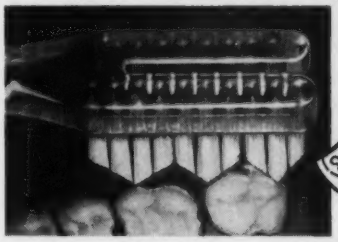

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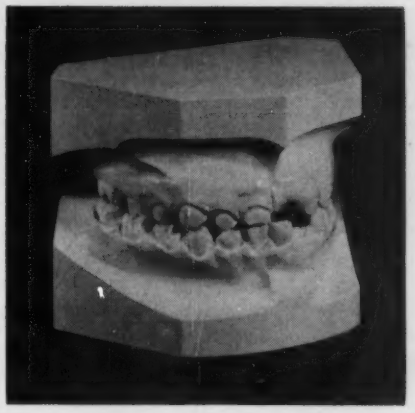

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